

CHILD PSYCHOLOGY



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CHILD PSYCHOLOGY

BY

MARGARET WOOSTER CURTI, PH.D.

ASSOCIATE PROFESSOR OF PSYCHOLOGY
SMITH COLLEGE

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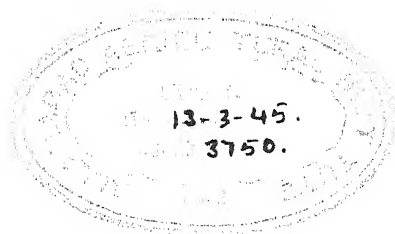
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TO THE MEMORY OF MY MOTHER
LILLIE M. WOOSTER



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PREFACE

THIS BOOK is intended to be a comprehensive survey of the psychology of the normal child. The special periods of childhood, infancy, early and middle childhood, and adolescence, are each worthy of intensive treatment in separate volumes, but there is an advantage also in having a unified view of the whole process of development up to maturity.

No attempt is made to present in separate chapters the important psychological material now available on special types of children, such as the defective child, the bright child or the nervous child; but studies of such children are cited chiefly for the light they throw on the mind of the normal child.

The treatment is topical, under such general headings as perceptual-motor learning, motivation, and thinking. The genetic development of the various modes of mental activity is emphasized, and also their interrelationships as different aspects of a unified course of individual development. In a final chapter on personality the bases and the nature of this unity are more fully brought out.

Since child psychology is at this time in process of rapid development, a leading aim of the book is to introduce the student to important experimental and observational work, and to lay the foundations for a critically appreciative interest in new studies which will appear. To that end

method has been emphasized throughout, and typical investigations have been cited in some detail for each main topic. The references and notes for each chapter should serve as a fair working guide to the chief factual investigations of the topic of the chapter up to the time of writing. The student should consult not only these but others which will have since appeared. At the end of the book are lists of selected references for supplementary reading for each chapter.

I am deeply indebted to Professor Harvey A. Carr, the influence of whose teaching will be apparent throughout the book, for his searching but tolerant criticism; to Gordon W. Allport and to my husband, Merle E. Curti, who each read the entire manuscript; to Frances Botkin Marshall, Margaret Miller Chenery, and W. S. Taylor, who read much of it; and to Howard M. Parshley, Harold E. Israel, Hanna Fay Faterson, and David Camp Rogers, who criticized particular chapters.

For aid in preparing the manuscript and proofs I wish to thank particularly Beatrice Jones Hunter, also Robert Leeper, Mary Pardee Allison, Lillian Levin, Grace McGrath, and several Smith College students, especially Pauline Moor.

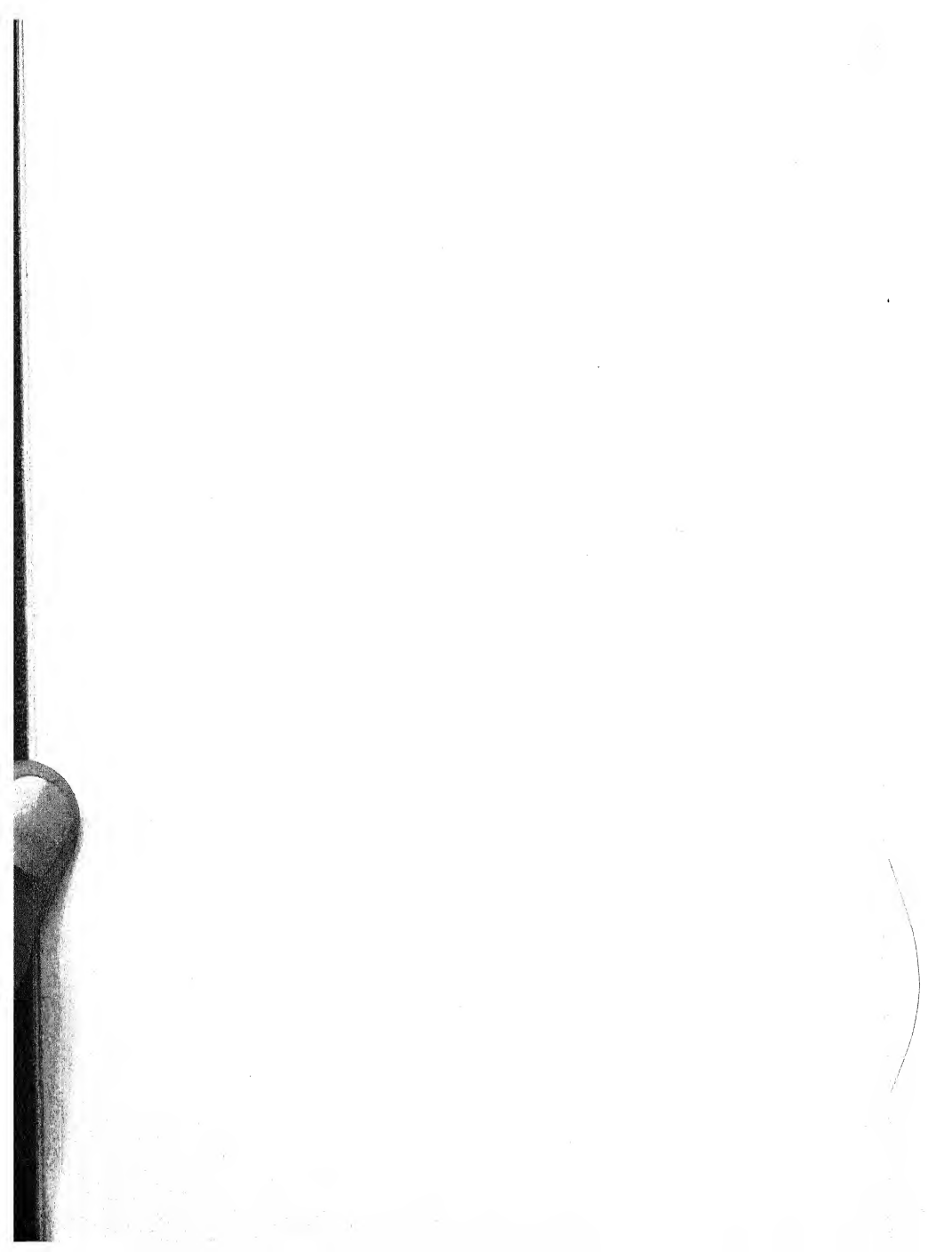
MARGARET WOOSTER CURTI

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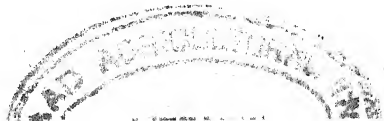
CHILD PSYCHOLOGY

CHAPTER I

INTRODUCTION

CHILD PSYCHOLOGY, in this second quarter of the twentieth century, has suddenly taken on vigorous life. The new psychological interest in children is but one reflection of a general preoccupation with problems of childhood. It is as if the World War had shocked the adults who manage the affairs of society out of their complacency, and had suggested to them that, with a better understanding of children, they might be able to rear a wiser generation. But there are probably numerous reasons for the awakening. The significant fact remains that everywhere in the western world parents and teachers, artists and ministers, authors and philosophers are eager for information about children; and that research in an attempt to supply it is going on not only in psychology, but in the other biological and social sciences.

It is noteworthy that all this work is increasingly being carried on with a realization of the essential unity of the problems involved. In other words scientists regard the



child as a growing, unified organism, and recognize that a study of the separate aspects of his nature and development should be made not because they are really independent, but only for the sake of convenience and effectiveness in scientific study.¹

POINTS OF VIEW IN PSYCHOLOGY

THE STUDY of mental activity in children has been hampered more than general psychology has been by the prevalence of certain theoretical assumptions about the nature of mind. We can better understand present-day conceptions and points of view when we see how they are related to certain earlier theories.

The Subjectivistic Tradition. — In the past an important group of psychologists has regarded mind, the subject matter of their science, as more or less synonymous with consciousness. In this they have followed an old tradition, a tradition especially emphasized and made prominent by Wundt in Germany. According to the Wundtian conception consciousness is made up of elements, or, to use a more recent term, of elementary mental processes. These include sensations, simple feelings, and perhaps relational or thought elements. More complex mental processes, such as perceptions, ideas, and volitions, are thought of as essentially aggregates or combinations of the elements. These compounds are gradually formed in the course of individual experience in accordance with certain laws, the most important of which are the laws of association.²

¹ See especially CRILE, G. W., *Man, an Adaptive Mechanism*, chaps. i and ii (Macmillan, 1916); and CONKLIN, E. G., *Heredity and Environment*, 5th ed., chap. i (Princeton Press, 1923).

² WUNDT, WILHELM, *Outlines of Psychology*, transl. by Charles H. Judd, 3rd Engl. ed. (Stechert, 1907); TITCHENER, E. B., *Lectures on the Experimental Psychology of the Thought Processes* (Macmillan, 1909).

According to this sensationalistic or "mosaic conception" of mind, mental development in the child is a process of more or less passive growth from the simple to the complex. The only strictly psychological method of investigation is introspection, or the observation by the subject of his own conscious processes and description of these in words to others.

Reliance on this method is a serious limitation to study. The method cannot be used with very young children, and therefore it is necessary either to neglect the period of early childhood (a common procedure in the past) or to use the doubtful methods of analogy and speculation. In the case of older children, however, the method can be employed with some degree of success; but since it is difficult even for a trained adult to give reliable accounts of his own conscious states, we cannot expect to obtain very accurate reports from older children, and their reports must be supplemented by the recollections, however inaccurate and fragmentary, of adults. It is partly because of such disadvantages as these, disadvantages which apply, although in lesser degree, to the study of adult consciousness, that there has been a strong reaction against the wholly subjectivistic point of view. Sensationalistic psychology, never dominant in the United States, has thus in recent decades become still less influential, as even its adherents have come to recognize some of its limitations.

The Functional or Biological Approach. — The trend toward a more objective interpretation of human nature has been due only in part to increasing realization of the limitations of the introspective method. Undoubtedly the greatest impetus to such a development has been given by progress in general biology. In Darwin's generation Herbert Spencer was urging that mind evolves in the process of

adaptation to environment, and we may say that the adjustmental point of view in psychology originated at that time. But this more objective movement did not attain great momentum until the accelerated development of experimental biological study, both of animals and of human beings, which marked the beginning of the present century and has continued unabated.

A second reason for the growing emphasis on adaptation, or the function of mental activity, lies in the discoveries of those students of mental disorders who within the same general period established the point that much important "intelligent" adaptation to conditions takes place without conscious awareness on the part of the subject. If this is so, then it would seem that the term mental should be so defined as to include much that is not conscious. This second line of development in psychology was advanced by pioneer work in France and in the United States, as well as by the later work of Freud and his followers in Austria.³

The more functional and objective trend in psychology has proved especially significant for the study of childhood. In the first place, both the biological and the clinical movements emphasize the importance of the early years as those in which are acquired some of the modes of behavior which are most directly related to later mental growth. In the second place they have suggested reliable objective methods by which it is possible effectively to study mental adaptation in young children as well as in adults.

The Nature of Mental Activity.—The new interest in the child as a growing organism has thus given rise to changed conceptions of the subject matter of psychology, as it has suggested new methods for its study. It is no longer

³ The pioneer work in France is represented by PIERRE JANET, that in the United States by MORTON PRINCE, and that in Austria by SIGMUND FREUD.

so common as it was to make a sharp distinction between mind and body. Nor is the conception of mind as consisting essentially of states of consciousness now held by any large number of psychologists. Mind, as the term is now commonly used, may be said to involve essentially the capacity for unified and effective adaptation to environment. One prevalent conception of the mental would include all such adaptive activity, even the simple movements of lower animals.⁴ Another would limit the application of the term mental to those adaptive activities of the organism which have been learned, or which show the effect of the past experience of the individual.⁵ The writer is at present in sympathy with the first and broader conception, since it is very hard to draw a clear line between behavior which does and behavior which does not show the effects of past experience. Jennings has pointed out, for example, how even in the one-celled animal *Stentor*, there is evidence of transient retention of the effects of past experience.⁶ The difference between such temporary modifications of behavior and the more lasting changes which involve complex mechanisms, seems to the writer to be a difference not in kind but only in degree. It would therefore seem truer to the observed facts of animal behavior to regard mind as very gradually developing both in the race and in the individual, with its germs, so to speak, in the very simplest adaptive responses made by a living organism as a whole. According to such a conception, the study of the development of mind in the child is largely the study of the gradual

⁴ This point of view is stated in different ways in the books by CRILE and CONKLIN, above referred to.

⁵ See, for example, CARR, HARVEY A., *Psychology: a Study of Mental Activity*, chap. i (Longmans, 1925).

⁶ JENNINGS, H. S., *Behavior of the Lower Organisms*, pp. 170-179 (Columbia University Press, 1923).

increase in complexity and effectiveness of adaptation from birth to maturity.

Child psychology has for its subject matter, then, the mental activity of children, or, to use another term, child behavior. This may be either overt, outer activity, such as climbing a ladder or shaking one's fist, or inner activity such as recalling a past event, being emotionally "upset," or thinking out a course of action for a possible future emergency. Overt behavior involves responses chiefly in the larger outer muscles of the body which are called striped or skeletal muscles, and is easily observed not only by other people, but also, of course, by the person who is behaving. In so far as any of his activity, overt or implicit, is experienced directly by an individual it is said to be, for him, conscious activity. Often activity occurs of which the individual is not conscious, but which may nevertheless be observed by another person.

The activity which takes place within an individual's body can usually be observed only by the individual himself. The observer experiences this inner or "implicit" behavior in essentially the same way that he experiences outer events. But owing to the inaccessibility of the parts involved in this behavior, the relative lack of finely differentiated internal sense-organs, and the inability of the subject quantitatively to compare his experience with that of other people, observation of such implicit activity, or "introspection," as it is called, is likely to be more vague and inaccurate than observation of overt behavior in the self or in others. In certain cases, however, as for example in emotional responses, it is possible by special methods to obtain objective records of some of these inner changes.

After the earliest childhood we should expect that every complicated adaptive response would include both overt

and implicit components. Any overt response would be likely to include not only outer components easily observed by other people, but inner components observable directly only by the individual himself. Thus a complete description of the facts of behavior, whether implicit or overt, would necessarily require the report of the subject. For practical purposes, however, especially in dealing with overt behavior, objective observation alone is often sufficient.

Although both types of observation (by self or by others) would be necessary for a complete description and explanation of human nature, the type used will depend on the circumstances. In the study of the infant we are forced to depend upon objective observation, as we are in the study of the animal mind. But as the child grows older he becomes more and more capable of giving usable accounts of his inner conscious experience, and those accounts are helpful in supplementing observations of behavior made by others. Therefore we may consider that the subject matter of child psychology includes not only child behavior which can be observed by other people, but activity which can be directly observed only by the child himself. In this book we shall draw upon both types of observation.

Through this consideration of changing conceptions of mental activity our preliminary definition has acquired clearer meaning. As the scientific study of the mind of the child, child psychology is seen to involve a study of both the inner and the outer activity through the organization of which the individual becomes adjusted to his world. This conception implies that for an adequate understanding of mental growth, we must be able not only to describe mental activity at various levels of development, but also to explain how it is that this development takes place.

AIMS OF CHILD PSYCHOLOGY

THE AIMS of child psychology have been variously conceived. One aim is to throw light on principles of general adult psychology. Emphasis on evolutionary and genetic theories of mental development has given rise to an increasing interest in the child mind, as well as in the animal mind and the mentality of primitive peoples. Psychologists recognize that an adequate understanding of the adult mind is impossible without a knowledge of its genesis. Thus child psychology fulfills an exceedingly important purpose in contributing to the building up of sound general theory.

It is usually agreed, however, that probably the most important aim is simply to understand the mind of the child himself; and to understand means to be able within the limits of the understanding to predict. But the word understanding itself requires definition. It is sometimes used as if synonymous with appreciation. This attitude among child psychologists is illustrated in a book by Waddle, who expresses regret that until very recently, "the beauty and glory of childhood as such was little understood or appreciated."⁷ The implication is that it is the business of the child psychologist not only to establish facts about mental life and principles for their explanation, but while so doing to maintain an attitude of admiration and reverence. Now no one would deny that it is desirable, in fact that it is of extreme importance, that a given child, and children in general, be appreciated richly, lovingly, and with a sense of wonder. The question is whether this is a desirable attitude for the child psychologist as a scientist while investigating

⁷ WADDLE, C. W., *Introduction to Child Psychology*, p. 16 (Houghton Mifflin, 1918).

and reporting the facts. If it is the exact and complete truth about the child mind that we wish ultimately to attain, we shall of course wish to maintain the attitude and to use the methods best calculated to secure this end. It has been customary to assume that the scientific attitude should be "fact-finding," impersonal, detached, and as free as possible from emotional bias of any kind. In the writer's opinion this attitude is correct, and is as proper for child psychology as for any other field of psychology. Emotional attitudes, of course — attitudes based on aesthetic, ethical or personal appreciations — will and should motivate the search for truth; but while that search is in progress its ends are most likely to be attained by the deliberate maintenance of a cool objectivity.

Besides rational understanding, another aim of child psychology, as of science in general, is control. We wish to understand the minds of children not primarily for the sake of the experience itself, but, when all is said and done, in order that we may more effectively direct their mental development. The achievement of this aim would also be hindered by the appreciative attitude in so far as that attitude would tend to encourage the use of partially intuitive judgments, that is, immediate judgments based not on a thorough rational analysis but depending upon the total relevant past experience of the judge, including his emotional responses. Now intuitively acquired "understanding," while it may assist the individual who has it himself to exercise wise control in a particular case, is not so likely to be generally utilizable as a more fully rational understanding in which the precise basis of the judgments made and the steps taken is known. The point is that in child psychology we wish, by studying and analyzing all the first-hand experience (observation and experiment) that is

available, to be able to make generalizations which can be imparted to others so that these too may exercise control. Any tendency to depend on intuition would mean a tendency to minimize the importance of this type of minute study, and moreover would mean that clear and usable statements of desirable procedure would be hard to make.

To illustrate the above argument from a homely field, let us cite the case of the old-fashioned cook who makes flaky white biscuit that melt in your mouth. She knows "intuitively" just when the dough is right, she never fails, she understands biscuit. But she is notoriously unsuccessful in imparting her understanding and her skill to others. If they finally succeed by her methods it is usually only after long experience, with many failures. A person wishing really to understand biscuit making with a practical purpose in mind, would do much better to consult a scientific receipt book. Or we might cite the case of parents who find that their child has a very high temperature and a rapid pulse. Instead of depending on the kind neighbor next door, for all her rich experience and her warm-hearted interest, parents of today have learned to call on a physician — and the best trained one they can get.

Desirable as is fully rational analysis based upon extensive objective study, it yet remains true that in dealing with topics in child psychology to which that sort of analysis has not yet been sufficiently applied, we must depend for our working hypotheses upon what might be called "intuitive judgments" based upon racial and individual trial and error. These we must utilize, conscious of what they are, until the science is further developed. Of course we should not want to depend upon kind neighbors, poets, or religious prophets for the final word on any psychological topic; but where psychology itself has nothing definite to

say, the generalizations based upon practical experience furnish better guidance than none.

The type of "control" actually exercised will of course depend entirely upon the values in human life which are considered worthy of attainment. Most scientists do not at present believe that the business of science is to set the standards of value. They arise out of the needs of the human organism, are developed and modified in the clash of motives, and become formulated in language—in proverbs and mottoes or in moral and legal codes—as human beings learn more and more effectively to exercise indirect or ideational control over their environment. The present standards of value of any individual or group are the outcome of a slow growth in social tradition, and they too are subject to change.

Psychology does examine and study the judgments of value prevailing at any time, the conditions of their development, their probable effectiveness in securing adjustment. But as science it does not say which are right and which are wrong. If the scientist is to be effective in searching out the truth and making it applicable, he must be as objective and impersonal as possible, making no judgments of right or wrong, ugly or beautiful. Recognizing that certain values or ideals for a desirable adult life at present exist, the child psychologist may legitimately point out how psychological principles may be applied in achieving those values. In fact, if ultimate control is a legitimate aim of science, it is a part of his business to point out such applications, since it is only through the testing of hypotheses and theories that their usefulness can be estimated, and genuine advance be made.

Methods in Child Psychology.—Having discussed the aims of child psychology, we may now consider the methods

by means of which they may be realized. Naturally the methods employed will vary according to the progress of the study of general psychology at the time.

1. *The speculative approach.* Long before psychology had become a science, theories about human nature were proposed which involved assumptions about the child mind, theories which are still influential. Into these early historical theories we shall not at this point go, important as they are for a complete understanding of the present status of psychology.⁸ We may merely call attention to the most important of the writers who in the pre-scientific period from the time of the Greeks to the middle of the nineteenth century dealt directly or indirectly with theories of child nature. These writers relied entirely upon ordinary observation and tradition, for scientific methods had not yet been applied to the study of the mind.

Plato in the *Republic* discussed in a stimulating way the education of the young, showing an appreciation rare at that time of the fact that both girls and boys need mental training as future citizens of a state. He emphasized the importance of innate ideas of the good, the true and the beautiful. Many centuries later John Locke in the *Essay on Human Understanding* presented a very different but equally influential theory of mental development, namely the theory that the mind of the newborn child is like a fair white sheet of paper, on which parents and educators may write almost anything they wish.

A century later, Rousseau set forth in *Émile* the first comprehensive theory of child nature. This brilliant study with its doctrine of the natural purity and goodness of the child

⁸ Good general summaries of the historical background are given in WADDELL'S *Introduction to Child Psychology*, chaps. i and ii, and in FLORENCE MATEER'S *Child Behavior*, chap. i (Badger, 1918).

and the corrupting influences of society, not only foreshadowed the romantic individualism of the period soon to follow, but is still influential, as reflected in the popular conception of childhood as the golden age. Following Rousseau the somewhat more careful and systematic treatments of Pestalozzi, Froebel, and Herbart stimulated interest in the child and contained the first more or less systematic formulations about his mental development. Based as they were, however, largely on *a priori* principles and uncontrolled observation of children, they make little contribution to the development of scientific methods of study.

2. *The biographical method.* Even before the middle of the nineteenth century, works began to appear which showed the importance of obtaining detailed and accurate accounts of development in individual children. Thus there gradually came into use the first really scientific method used in child psychology, which may be called the biographical method. The first account of children's early mental development was published by Tiedemann in Germany about 1787,⁹ and this was followed by some others which were even more detailed and accurate.

In 1882 appeared *Die Seele des Kindes* (*The Mind of the Child*), by Preyer, a German physiologist. This was a careful record, made from notes taken down at the time, of important events of the first three years of life of his little son, with suggestions about the probable course of development of children in general. Such facts were noted as reflexes present at birth, time and manner of appearance of first reaction to light, development of the grasping reaction, and the like. Here we have the beginning of first-hand

⁹ See MURCHISON, CARL, and LANGER, SUZANNE, "Tiedemann's Observations on the Development of the Mental Faculties of Children," *Ped. Sem. and Jour. Genetic Psychol.*, 34: 205-230 (1927). Mrs. Langer's is the first careful English translation of this interesting monograph.

systematic observation of facts, with the explicit suggestion of the value of a plan for continuous controlled observation, not only of children but of animals.¹⁰ This is an anticipation of the method developed and used thirty years later by Watson and others in the study of children. It has been used also by many zoölogists and psychologists in that observation of animals which developed into animal psychology and which gave such impetus to the genetic and objective study of mind.

Following Preyer the biographical method was used by a number of writers with varying degrees of success according to their training and the facilities they had for accurate observation and recording. The record of Perez (*Les Trois Premières Années de l'enfant*) is one of the most significant. Miss Shinn's *Biography of a Baby*, a careful and charming account of the first year of life of her niece, is still of genuine value. Other more recent baby biographies such as those by the Scupins and the Sterns in Germany, and the one by Professor Dearborn, among others, in the United States, contributed valuable data.¹¹

In certain definite ways the usefulness of the biographical method is limited. In the first place, even the most scientific parent may be somewhat biassed in his selection of events to record, if not in his observation, by love for the child and desire to have him excel. Again, owing to lack of time or definite planning, the observation is apt to be only casual, and much that is important may be missed. For

¹⁰ PREYER, WILHELM, *The Mind of the Child*, trans. by H. W. Brown (Appleton, 1890).

¹¹ PEREZ, BERNARD, *La psychologie de l'enfant; les trois premières années de l'enfant* (Paris, Bibliothèque de philosophie contemporaine, 1892); SHINN, MILLICENT, *Biography of a Baby* (Houghton Mifflin, 1900); DEARBORN, G. V. N., *Moto-Sensory Development* (Warwick and York, 1910); SCUPIN, ERNST und GERTRUD, *Bubi's erste Kindheit* (Grieben, Leipzig, 1907); STERN, WILLIAM und CLARA, *Monographien über die seelische Entwicklung des Kindes* (Leipzig, Barth, 1907, 1909).

example the steps of learning behind a given bit of behavior may be entirely overlooked. Then too, the general lack of experimental control and statistical analysis lessens the reliability of results. One father had noted in the diary that the baby, nine months old, showed a preference for using her right hand, when it occurred to him to see in how many of twenty trials she would reach for a toy with the right hand. In the test, this hand was actually used only forty-five per cent of the time. A fourth and probably the most important limitation of the biographical method is its slowness. The technique of observation has not been up to this time sufficiently standardized to make possible mass treatment of the data. Even though the method of observation is now being standardized, progress by this method is bound to be slow.¹²

In spite of those disadvantages, however, the biographical method is of great value, particularly for the psychology of early childhood. The study of complete biographies, carried further, to be sure, than most of those that we now have, may be expected to throw important light not only on instinct, learning, and individual differences but on the origin and development of personality traits and types, and upon general problems of intelligence, temperament and character. The biographical method, as supplementing other methods and as suggesting problems for research, should be increasingly valuable.

3. *The questionnaire method and the child study movement.* At about the time Preyer's book appeared, G. Stanley Hall, "Father of the Child Study Movement," was making in Boston an investigation of "the contents of chil-

¹² *The Modern Baby Book*, by J. E. ANDERSON and FLORENCE GOODENOUGH (Norton, 1929), offers an excellent plan for standardized observation, and may result in the accumulation of very valuable data.

dren's minds."¹³ This proved to be a very important contribution to the methodology of child psychology. It was based on an investigation in Germany conducted by the Berlin Pedagogical Society in 1869, and made use of the same method, modified in such a way as to be usable with the American school children. This was the famous questionnaire method. Four Boston kindergarten teachers questioned the children in groups of three, following a list of one hundred and thirty-four questions designed to test the child's knowledge of the world, such as "Have you seen a sheep?" "Where are your ribs?" "Have you seen a bricklayer at work?" "Have you saved cents at home?" When the child reported that he had seen such and such a thing, supplementary questions were asked, such as "How large is it?" "What color?" and the like. The answers were recorded. For each object the child was credited with either knowing or not knowing the concept, although it is apparent there must have often been doubt in the mind of the questioner. Besides these four examiners, about sixty other teachers reported results from using the same list. Results from over two hundred children were presented.

The most important result of this study was its revelation of the meagerness and inaccuracy of the ideas of young children, even when the corresponding words are glibly used. The educational application was strikingly clear, and the work proved very stimulating to teachers.

Another form of the questionnaire method as developed by Hall was much more commonly used than this method of direct questioning. To save time and trouble the questions were printed on blanks, with spaces left in which adults reported childhood experiences or observations of

¹³ HALL, G. S., "The Contents of Children's Minds," *Ped. Sem.*, 1: 139-173 (1890).

children, or school children themselves filled in the answers. In this way it was possible quickly to obtain a very large number of answers. These were often elaborately classified and presented in statistical form in tables and graphs.

An example of this use of the questionnaire method is "A Study of Peculiar and Exceptional Children," an article by E. W. Bohannon appearing in 1896.¹⁴ The questionnaire on this topic, addressed to adults, brought out descriptions of over one thousand cases, reported mostly by students of normal schools. They were asked to describe any cases of "peculiar and exceptional children" known, whether the source might be one's own childhood, children of self or friends, or children read of, whether fact or fiction, also to classify each child according to "types" suggested, as, for example, according to beauty, selfishness, daintiness, nervousness, or clumsiness. To quote from the instructions, "It is not a description of one or more of the above traits that is wanted, but an account of one or more individual cases where one trait or group of traits is so marked as to color the entire character of the child." The instructions went on: "Note in each case, if you can, whether the trait is hereditary; in which parent, how far back can it be traced, and how marked was it in the ancestry? To this point the greatest importance is attached, and it should receive special attention. . . Write at the head of the first page of each case one or more words designating the type, as a dirty child, a precocious child, etc." In over fifty pages of the *Pedagogical Seminary* the thousand cases thus described were elaborately analyzed and interpreted, six of the pages being devoted to statistical analysis.

¹⁴ BOHANNON, E. W., "A Study of Peculiar and Exceptional Children," *Ped. Sem.*, 4: 3-60 (1896).

Such a study as Bohannon's may well have proved stimulating at the time it was written, but as a contribution to scientific knowledge it is worth little. Few of the possible sources of error in gathering data are guarded against, there is uncritical acceptance of popular conceptions of heredity, and the conclusions are not justified by the evidence presented. Moreover, the material is of such a nature that no use of statistics in dealing with it can make it accurate or definite.

These two examples of the questionnaire method, though of unequal value, may be considered typical. They suggest the many sources of error in the method in either of its chief forms. Hall himself, although he introduced it into this country and made enthusiastic use of it for many years, recognized the chief defects of the method. In "The Contents of Children's Minds" he wrote, "The difficulties and sources of possible error in the use of such questions are many. Not only are children prone to imitate others in their answers without stopping to think and give an independent answer of their own, but they often love to seem wise, and, to make themselves interesting, state what seems to interest us without reference to truth, divining the lines of our interest with a subtlety we do not suspect . . . the faculties of some are benumbed and perhaps their tongues tied by bashfulness, while others are careless, listless, or inattentive, and answer at random. Again, many questioners are brusque, lacking in sympathy or tact, or real interest or patience in the work, or perhaps regard it as trivial or fruitless." It is apparent that most of these criticisms apply equally well to the printed questionnaire. It seems a pity that Hall, aware as he was of the drawbacks of the method, should yet have placed such reliance on conclusions drawn from its use. False confidence in these conclusions was

strengthened by the large number of subjects, the great mass of data, the impressive curves and tables. But it is now pretty generally held that the method as used by Hall and his followers yielded results little more than suggestive, and not at all justifying the mass of generalizations about every phase of child nature which were made freely on the basis of material thus gathered.

Not only were complex problems in psychology dealt with by the questionnaire method, but many sorts of problems of hygiene and health, of religion, education and home life were investigated. Although in this country a psychologist and his students were leaders and directors in the work of investigation, they were "aided" by an army of untrained teachers and parents. Under Hall's stimulus the "Child Study Movement" developed and became organized during the nineties into countless associations and study circles, with meetings and publications. After the end of the century the movement waned. Interest in children has undoubtedly steadily increased, but it gradually became clear that the best way to gain a scientific understanding of them was not through this sort of general study. And so "Child Study" has been replaced by a number of technical fields of which child psychology is but one. There is coöperation and synthesis by various agencies and in various ways, but the old effort to establish a single "science of childhood" has been given up.

The questionnaire method as used in the pioneer days of child study was, in spite of its defects, of considerable value in stimulating interest in children, and sometimes in setting well-defined problems for further study. The formation of hypotheses is of course an essential step in scientific work. Of late years the same method, refined and modified, and with more adequate and critical use of statistics, has yielded

valuable results in child psychology. It has, however, its inherent defects.

4. *The method of experiment* is of real although limited usefulness in the study of children. A certain amount of experimental work with older children, in which well-defined problems are set and a standard procedure applied to a number of children, has been going on during the whole of the modern experimental period. For example, by requiring children to report on standard pictures exhibited to them, and to answer definite questions about what they saw, valuable information has been obtained about the reliability of observation and report in children. The extent to which children, as compared with adults, are subject to illusions, has been studied, individual differences in reaction time to simple stimuli have been investigated, and other problems have been dealt with in various ways.

But children in general are not particularly good subjects. Since they lack, as a rule, developed intellectual interests, it is hard to provide strong enough incentives for continued work. Their attention is easily distracted, and, too, they lack the training in methods of accurate observation which is often requisite. Especially in experiments requiring introspective reports are they likely to be unreliable subjects, not only through lack of technical training in a type of observation which is difficult even for adults, but because they are more suggestible than grown people.

Since 1917, when John B. Watson began to apply Preyer's suggestions for studying native responses, infants and very young children have been used more and more as subjects for experiment. In his very significant work, Watson used the general method of continuous experimental control beginning at birth. The procedure at a given time was usually to place the infant in a natural situation, varying

certain aspects of the situation and recording the responses. For instance, he presented live animals to infants who had never seen animals, to see if a fear response would occur, and in this way obtained evidence indicating that fear of animals is not a native response.¹⁵

Others have recorded the time and number of trials required by infants to solve simple problems, such as that of obtaining a piece of zwieback by an attached string. Phonographs and dictaphones are now being used to study early speech development. Infants are placed in standard situations to observe the character of social responses that may occur. By the use of such objective methods it is proving possible to obtain extremely valuable information about early mental development.

At first there was a good deal of resistance to the idea of experimenting with "helpless babies," but as the harmless character of the work became evident, that resistance, among those familiar with the work, has largely broken down. Watson insisted that the "wear and tear" to which infants were subjected in his work was nothing compared to what they daily experienced in the ordinary processes of dressing and bathing; and those familiar with the struggles of the average tiny baby in the days before he becomes used to such things, will appreciate the point. Even if momentary pain is occasionally involved, it is urged that this is not in itself harmful, and that great good may come for babies in general as a result of these experiments. As a matter of practice the "experiments" usually involve no unnatural strain. They are commonly in the nature of play situations to which the infant responds in the most natural manner.

¹⁵ WATSON, J. B., and RAYNER, R., "Studies in Infant Psychology," *Sci. Mon.*, 13: 505-514 (1921).

In general, for all the reasons given, the method of experiment, both in the study of infants and of older children, involves many limitations and occasions for caution. There is no doubt, however, about the value of experimentation when it can be used, and we may hope for much from the improvement of objective techniques of handling children as subjects.

5. *The method of testing* was a natural outgrowth of the early experimental work with children. This method is essentially a procedure involving the application of standardized experimental situations to large numbers of children, or to the same children at different ages. The results are then scored and treated statistically. The method was first worked out in a formal way by Alfred Binet, in order better to detect backward children in the public schools of Paris. Binet and his colleague, Dr. Simon, presented standard problems, puzzles, and other tasks to the subjects, and compared their performance with the average performance of children of the same age. The advantages and defects of the testing method will be brought out in later sections of this book.

Applied at first in the study of individual differences in special capacities and in general intelligence, the method of testing has by this time also come into extensive use for the study of vocational aptitudes and of character traits. The relation of all these general and special abilities to various hereditary and environmental factors is investigated by the aid of statistical treatment of the test scores. It is the increasingly effective statistical treatment which has made this method one of the most valuable we have for the study of the mental life of children.¹⁶

¹⁶ THOMAS, W. I., and THOMAS, DOROTHY S., *The Child in America*, chap. viii, "The Psychometric Approach" (Knopf, 1928). This chapter is a critical and

6. An important contemporary method of studying the development of mind in the child we might call *the psychophysiological method*. It consists in the attempt to correlate the general physical and physiological growth of the child with changes in mental life. Studies of embryonic and foetal behavior in animals and in human beings are beginning to throw light on the origin of the reflex or instinctive activity which is basic in mental development, as well as on the general problem of the relative effects of heredity and environment in determining mental and physical traits.

Investigations of the relation between anatomical and mental growth in the child, and of the relation of such growth to the factors of nutrition, exercise, and general health, have also proved very illuminating.¹⁷ For example it has been shown that a great deal of feeble-mindedness formerly attributed to germ-plasm heredity is the result of such factors as parental alcoholism, or of malnutrition in the fetus or the infant. In this work psychologists and physiologists are beginning to coöperate in an effective way, realizing more and more the artificiality of a sharp division between their respective fields.

7. *Clinical studies, specially of nervous, mentally unstable, and abnormal subjects* have proved an important source of data for child psychology. It is probably largely as a result of analyses of the mental history of maladjusted adults that attention has been drawn to the importance of unfortunate emotional experiences in childhood as factors in later maladjustment. Adult analysis in so far as it succeeds in un-

stimulating discussion of the method of testing, and presents summaries of important studies. The book is a most valuable general source of information for students of child psychology who are interested in social applications.

¹⁷ THOMAS and THOMAS, *The Child in America*, chap. xi, "The Physiological-Morphological Approach."

earthing significant childhood memories and showing their relationship to defects of adjustment, must be regarded as a valuable method for child psychology; and with the improvement of existing techniques for the recovery of these experiences we may hope for still more significant work.

The growth of the mental hygiene movement in this country, a movement having its origin in work with mentally disordered adults, has resulted in the establishment of a large number of psychiatric and psychological clinics for children. In these clinics, directed by psychiatrists (physicians who have specialized in mental diseases) or by psychologists, "problem children" are given thorough examinations, both mental and physical. In an effort to discover the source of the difficulty careful investigations are made of the home and neighborhood environment in which the child grew up. The main aim in the analysis is to trace the genetic history of the trouble. Such thorough study, in the light of the knowledge gained from clinical studies of adults, is contributing a great deal to our knowledge of the origins and growth of maladaptive habits and emotional attitudes.¹⁸

Although Freud and his followers have had a most important influence in the development of clinical methods for the study of children, they have by no means been the only workers in this field. The objective psychologists and such psychopathologists as Morton Prince have emphasized the importance of the early years and of subconscious impressions, although their interpretations of various adjustments are different. In general, psychologists question the soundness of orthodox Freudian interpretations, and there

¹⁸ For citation of interesting cases with references to the literature, see TAYLOR, W. S., *Readings in Abnormal Psychology*, pp. 379-383, 388-390, 557-560, 606-610, 622-625 (Appleton, 1926). See also MURPHY, GARDNER, *An Outline of Abnormal Psychology*, pp. 277-314 (Modern Library, 1929).

is some feeling that the type of psychoanalysis of children now advocated by Freudians is a method of doubtful value to the child, mainly as suggesting questionable interpretations of his own conduct.¹⁹

Clinical studies of normal children, conducted in various ways, form a most useful supplement to the study of unstable or abnormal children. It is becoming more and more common to seek psychological advice about the training of children whose mental soundness is not questioned, for there are all degrees of maladjustment and few children are perfectly adapted. Hence the same sort of careful clinical study that has long been made of problem children, is also being applied to ordinary children.

Clinical methods of studying children would be greatly improved if the psychiatrists (who are often Freudians) and the psychologists could better understand each other's work. But however much divergence of theory there is, the fact remains that in the direct clinical study that is being increasingly carried on we have a fertile source of valuable data and valuable concepts. In the analytical work of the psychologist as well as that of the psychoanalyst there is an important source of error in possible distortion of memories through suggestion. Certainly clinical analysis should be carried on only by those who have not only the requisite psychological knowledge and critically objective attitude, but who have also acquired the delicate technique of eliciting straightforward replies or accounts with a minimum of suggestive questioning. As data gained in this manner accumulate, carefully checked by objective means whenever possible, our understanding of the mental growth of children will be greatly increased.

¹⁹ WOHLGEMUTH, A., *A Critical Examination of Psychoanalysis* (Macmillan, 1923).

8. *Personality studies* aiming to throw light on special problems of individual development are important in child psychology. Under the head of "personality studies" we may classify the reports on individual children, based on observations in school or at home, which point out dominant traits and attempt to present a description of the total personality. Such reports, while often more or less fragmentary, are yet useful as furnishing data on specific problems and as supplementing other work. In these personality studies use has been made not only of observations of everyday overt activity, but of diaries, letters, literary and artistic productions and reports of dreams and day-dreams, materials which although possessing certain limitations have yielded valuable information.

Probably the most important studies of personality are those which attempt, not to describe an individual personality, but to isolate certain traits, such as the tendency to submit to others, or certain types such as the "extrovert" is supposed to be. These traits or types are measured by various means, such as tests, questionnaires or rating-scale devices; and by statistical analysis an attempt is made to show their relationships to each other and to various conditions. Both these methods of personality study, that of direct synthetic studies of individual children, and that of statistical analysis of types and traits, have already yielded very suggestive results. They supplement each other well and should prove more and more valuable.²⁰

Conclusion. — We have given in this chapter only a very brief sketch of theories, aims, and methods in child psychology. The treatment of methods now being used can of course give but a mere suggestion of the character of the

²⁰ THOMAS and THOMAS, *The Child in America*, chap. ix, "The Personality Testing Approach," and pp. 515-544 of the chapter on "The Sociological Approach."

work that is being done. The actual nature of the work and the extent of the results accomplished will be indicated in some detail in various chapters of this book. Meanwhile, however, even this outline makes it clear that psychologists are working energetically, along with other investigators, to supply the accurate knowledge about children which is so sorely needed by those who have them in charge.

CHAPTER II

THE CHILD'S MENTAL INHERITANCE

We know that the greatest men of the race were once babies, embryos, germ cells, and that the greatest minds in human history were once the minds of babies, embryos and germ cells, and yet this stupendous fact has had but little influence on our beliefs as to the nature of man and of mind.

—E. G. CONKLIN.

THE LIFE of the child begins with the union of two germ cells. Out of the single fertilized cell thus formed, out of this bit of protoplasm too small to be seen with the naked eye, there develops a new human being, body and mind, structure and behavior. Since body and mind develop together we can understand mental heredity and mental growth only in connection with the study of physical heredity and physical growth.

In considering the child's mental inheritance, two main problems claim our attention. First, in the case of particular parents what can be predicted about the mental capacities and traits of their children? Second, what mental capacities and traits may be said to be hereditary? In order to answer these questions it is necessary briefly to consider the mechanism and laws of heredity as worked out for single physical traits. After that we shall be in a position to say whether these generalizations apply also to mental traits.

In this chapter, following the usual custom of biologists, we shall use the word trait in a very broad sense, as referring to any mode of activity which is characteristic of an organism, from a peculiar way of winking the eye to such characteristics as timidity or honesty. The word *capacities* will be used in a similarly broad sense. As a matter of fact, the term trait as used in biological discussions of heredity usually includes capacities too, and for present purposes it is not important to insist on a distinction. Not until the later chapters of this book, after we have gained a clearer idea of the origin and mode of development of characteristic ways of behavior, shall we attempt a closer analysis of these terms. In this particular chapter we shall deal for the most part with individual differences in "traits," leaving for a later chapter the discussion of native responses peculiar to the species.

THE MECHANISM AND LAWS OF HEREDITY¹

The Process of Fertilization. — After the act of sexual intercourse one of the many male germ cells or spermatozoa which have been set free in the body of the female may unite with one of the numerous egg cells. As soon as the tiny sperm cell, thousands of times smaller than the egg, has penetrated it, there begin very complex but orderly and definite changes. The process has been carefully and systematically observed under the microscope for many animals, and we have every reason to believe that the same series of changes occurs when the human egg cell is fertilized. The most striking and significant thing about

¹ This account follows closely the order and treatment of topics in CONKLIN, E. G., *Heredity and Environment*, 5th ed. (Princeton Press, 1922). Every student not familiar with the chief facts of cell structure and cell division should study these topics in CONKLIN, or in some such text as HERBERT E. WALTER's *Genetics* (Macmillan, 1921).

fertilization is the systematic way in which the chromosomes of the two germ cells unite. Chromosomes are minute stainable bodies, definite in size, shape, and number, found in the nuclei of cells.

After the mature male cell or sperm has penetrated the female cell or egg cell (stage 1 in Fig. 1), its nucleus enlarges and approaches that of the egg cell (stage 2). Finally the chromosomes of the two cells, which have meanwhile taken clear shape (stage 3), split lengthwise (stage 4). The new chromosomes thus formed pull apart and migrate toward the opposite ends of the cell, which is already beginning to constrict preparatory to division (stage 5). After the cell has divided into two (stage 6) each of the new cells has thus a nucleus containing the number of chromosomes characteristic of the species. Careful study has shown that in the migration of the chromosomes half the paternal chromosomes go to one side and half to the other side; and so with the maternal chromosomes. Hence in the two daughter cells which are finally formed each nucleus contains chromosomes half of which come from the father and half from the mother.

The first division of the fertilized egg cell is followed by continued divisions. In each cell division, each of the two new cells formed receives again half the maternal and half the paternal chromosomes; and this holds true for every body cell subsequently formed throughout the life history of the new individual. This fact of equal contribution from the father and the mother to the chromosome-equipment of the individual is suggestive in connection with the ordinary observation that a child is as likely to be like one parental stock as the other. It suggests that it is in the chromosomes that we have the basis for hereditary transmission, since they are the only parts of the paternal cell

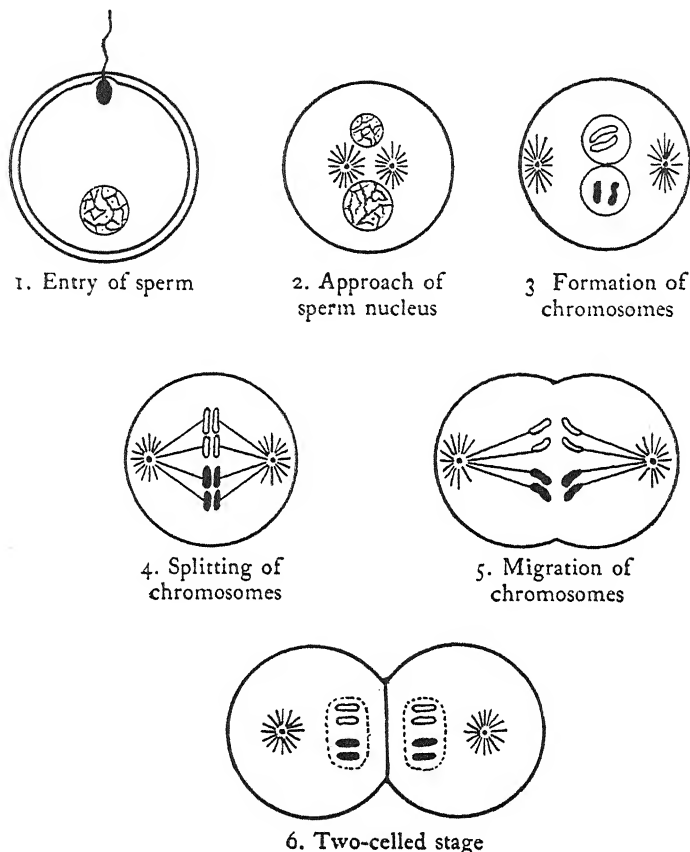


Fig. 1. THE MECHANISM OF FERTILIZATION

In this diagram it is assumed that four is the number of chromosomes characteristic of the species. Paternal chromosomes are represented as black, maternal chromosomes as white. (From H. E. Walter, *Genetics*. Reprinted by permission of the Macmillan Company, publishers.)

that are always passed on. How the biological heredity of the new individual may be determined by the contributions of the two parental germ cells, the chromosome theory of heredity seeks to explain.

The Chromosome Theory of Heredity. — Convincing evidence of the crucial importance of the chromosomes in heredity is derived not only from study of their rôle in fertilization, but also from observation of their complex behavior in the maturation process preceding fertilization. During prenatal growth when the sex cells (making up the "germ plasm") are being formed, the cell divisions are of the ordinary sort in which the chromosomes split and each new cell receives half from the father and half from the mother. This period is called the division period (stage 1 in Fig. 2). But these cells, which are set aside early in the course of prenatal development, do not keep on dividing as the body cells do. Instead there is probably present at birth, in each human female, the complete number of sex cells which she will have as an adult. In the case of the male there are many more cell divisions than in the female, so that the male sex cells are both much smaller and much more numerous than the female sex cells.

At some time in the period between birth and the time of puberty, the maternal and paternal chromosomes within the sex cell come together in pairs. This process is called synapsis or conjugation of the chromosomes (stage 2 in Fig. 2). Finally, at the close of the growth period both the male and the female sex cells undergo two very special divisions, as a result of which they become mature sperm and egg cells capable of playing a rôle in the process of fertilization. In one of these divisions, usually and perhaps always the first, the cell (which has undergone synapsis) divides into two new cells, each of

which receives half of each double chromosome (stage 3 in Fig. 2). In the process the pairs of chromosomes merely separate again, with no such splitting as occurs in mitosis. Thus the resulting mature cells each contain half the num-

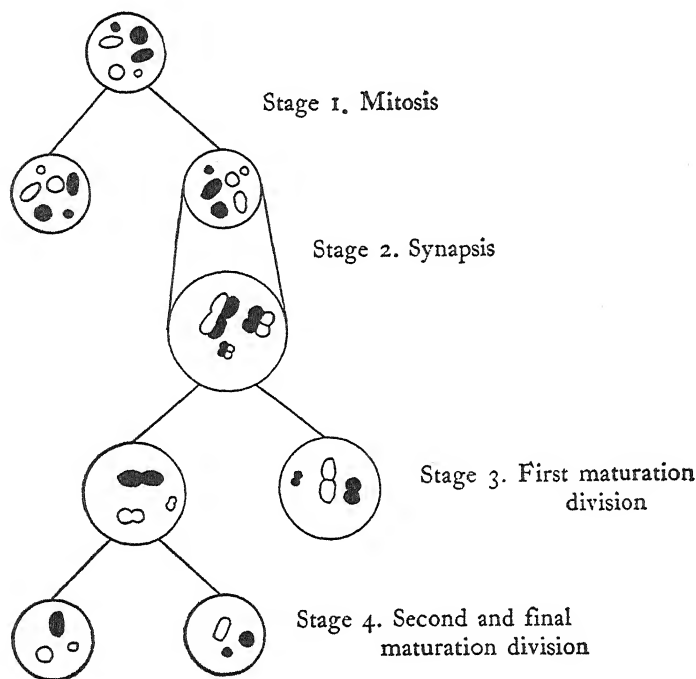


Fig. 2. MATURATION OF THE GERM CELLS

In this diagram it is assumed that six is the number of chromosomes characteristic of the species. Paternal chromosomes are represented as black, maternal chromosomes as white.

ber of chromosomes characteristic of the species. In human beings, in the cells of which the characteristic number of chromosomes is 48, there are in each of the cells resulting from this reduction division, 24 chromosomes.

In these cells there is an exception to the general rule of an equal contribution of maternal and paternal chromosomes, for when the pairs separate to go into the new cells, it is a matter of chance what contribution of maternal or of paternal chromosomes each cell will receive. Some may, theoretically, receive all maternal chromosomes, and some all paternal, but the chance of such a distribution in human beings is very slight. In general the cells will receive partly maternal and partly paternal chromosomes in varying combinations. A study of stages 2 and 3 in the diagram will make this clear. (In the generalized diagram it is assumed, for the sake of clearness, that the number of chromosomes characteristic of the species is six. The paternal chromosomes are represented as black, the maternal as white. Although there are actually differences in detail in the maturation of the male and of the female cells, the essential changes are the same, and the diagram represents the process for both male and female cells.)

In the second maturation division, which follows immediately upon the first, these cells, which have a reduced number of chromosomes, divide again, this time by mitosis, so that each of the new cells formed has also the reduced number (stage 4. Second maturation division). After some modification in form the germ cells are mature, and ready to unite with cells from an individual of the other sex.

We can see that the maturation divisions constitute a method by which the number of chromosomes in the species is kept constant, for when two mature cells unite in fertilization, the number usual in the species is restored. We shall also see that these special preparatory changes accomplish the result of producing new germ cells, each of which is very much diversified.

According to the chromosome theory of heredity definite individual traits are represented in the chromosomes, and so the combination of different chromosomes in the new organism will mean the combination of different ancestral traits in the individual. Since the mature germ cells will have received maternal and paternal chromosomes in various proportions, in any adult female individual each germ cell will represent a new combination of her ancestral traits — each of the many thousands of egg cells she produces may be unique. The same will hold true for her mate — each of his germ cells is likely to be unique, representing varying combinations of his maternal and paternal ancestral traits. Conklin has calculated that in woman, where there are after synapsis 24 pairs of maternal and paternal chromosomes, the possible number of combinations in the distribution of these to the different egg cells would be two raised to the twenty-fourth power, or 16,677,036, and the possible number of different types of fertilized eggs or oöperms which could be produced by a single pair of parents would be 16,777,036 squared, or approximately three hundred thousand billions.

In any given mating it is a matter of chance which two germ cells will happen to unite, and this makes the chance of prediction still more remote. The situation is made even more complex, and prediction more difficult, when we consider that according to recent research, within the chromosomes themselves there are more minute units (genes or factors) which are the real determiners for traits. These genes, experiments show, divide, segregate, and re-combine as do the chromosomes in which they are contained.

Mendelism and the Theory of the Gene. — In the case of a few simple and easily measurable physical traits in ani-

mals, experimental breeding has shown that these traits appear in such an orderly way that relatively accurate prediction is possible.

In the sixties an Austrian monk, Gregor Mendel, published a report of experiments on sweet peas, and suggested "laws" to explain the appearance of special characteristics in the offspring. Especially since 1900 has extensive and remarkable experimental work been going on in an effort to determine the validity of Mendel's theory. While this has led to important modifications of the theory, in its main outlines it has been confirmed. It has been definitely established that certain traits are "dominant" over corresponding traits (*e.g.*, black coat over white coat in guinea pigs), and may be expected to appear in the offspring when an individual possessing the dominant trait mates with one which has the corresponding recessive trait. But although the offspring all show the dominant trait, each carries latent in his germ cells the factor or factors for the recessive trait as well, and when two such hybrid individuals unite, the latent trait will appear again in some of the offspring. To illustrate, the progeny of a pure-bred black guinea pig and a pure-bred white guinea pig will all be black. But they will all "carry" in their germ cells the determiners for the recessive trait, and so among the total offspring of any two members of a second generation of this sort, there will be individuals showing outwardly the recessive trait, white coat.

Such results can be understood in the light of the theory that each trait is represented by a particular gene or combinations of genes in the chromosomes. The behavior of the chromosomes during maturation is exactly what would be required to explain the results of experimental breeding. Particular kinds of chromosomes that have been together

in the same cell separate out and go to different cells, while later they may by chance re-combine with similar chromosomes. This behavior of segregation and re-combination is very significant. It helps to explain the experiments of Mendel as well as recent experiments in genetics, experiments which not only point to the importance of the chromosomes in heredity, but make possible a certain amount of prediction concerning the simple physical traits of the offspring of two given animals.

But the conditions of inheritance even of these traits are extremely complex. As a matter of fact even the simplest physical trait must be carefully isolated and studied in many different generations, with much variation of conditions, before it is possible to make reliable generalizations about the appearance of that trait in the offspring of particular matings. The experimental study of genetics is yet in its infancy—knowledge of the gene for example has been obtained only in the last few years—and so we must not be over-confident about the value of the conclusions already tentatively made, or over optimistic about the possibility of their immediate application.

Heredity and Environment in Early Development. —

It appears from the foregoing discussion that the hereditary characteristics of the child must depend upon factors in the two parental cells from which it was derived. But it is clear that these factors represent simply hereditary potentialities, the realization of which is dependent upon the normal environmental conditions. Thus the matter of prediction is still further complicated by the fact that hereditary factors may exist, but owing to the conditions of development may not be realized. A consideration of the general nature of prenatal development will help us to understand this point.

Outline of Normal Prenatal Development. — As the oöperm or fertilized egg divides repeatedly the new cells, all alike, cohere in a loose mass which grows rapidly in size and complexity. Soon the cleavage cells become differentiated, and certain of them are observed to contain particular kinds of substances. Then the mass gradually assumes the shape of a hollow sphere (the blastula), and different layers begin to form from which the various organs of the body gradually develop. As the embryo develops, a thick outer coat forms, which sends out a vascular prolongation, the umbilical cord. This becomes attached to the wall of the uterus by villi, or vascular finger-like processes from the end of the cord. Figure 3 illustrates this mode of attachment. The villi may be thought of as attaching themselves to the wall of the uterus by a sort of interlacing of processes, much as the two hands are sometimes joined by interlacing the fingers. Now both the inner wall of the uterus and the villi from the embryo are supplied with many blood vessels, and since the two are in close functional contact, the embryo, by absorption, readily takes in from the blood of the mother blood plasma containing oxygen and nutritive materials. Thus from the maternal intra-uterine environment the embryo gets the nourishment necessary for growth, but "not a strand of protoplasm, not a nerve fibre, not a blood vessel passes over from the mother to the embryo." (Conklin.) She is merely its nurse, feeding it and protecting it until it is large and strong enough to live outside her body.

Normal Prenatal Influences of the Environment. — The consideration of these factors of prenatal development at once enables the student to see why popular theories of prenatal environmental influence cannot be taken seriously. A strawberry shaped birthmark on the infant's arm can hardly be due to a longing for strawberries on the part of

the mother during pregnancy, or a cane shaped brown patch due to her sympathy for an old man with a cane. The foregoing discussion indicates that there is no known mechanism by which such experiences could affect the

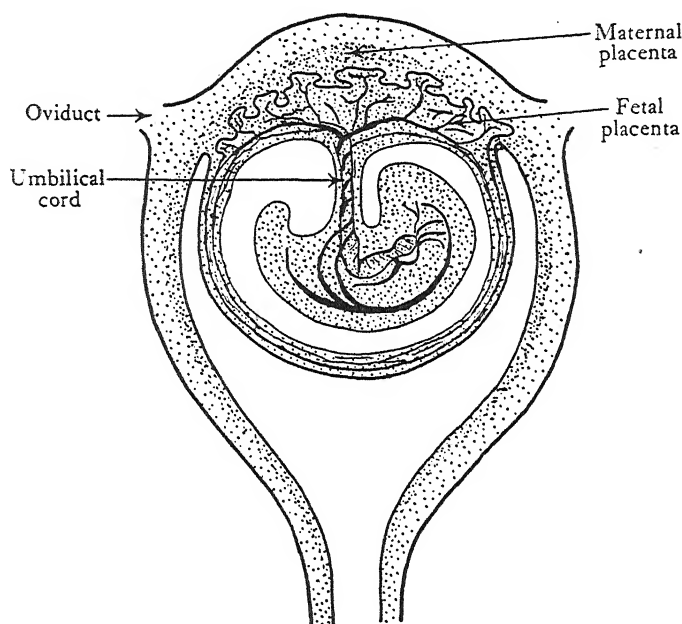


Fig. 3. SHOWING MODE OF ATTACHMENT OF FETUS TO WALL OF MATERNAL UTERUS

Diagram from Kingsley's *Textbook of Vertebrate Zoölogy*. Used by permission of Henry Holt and Company.

embryo. Moreover, in dealing with the popular "evidence" for such prenatal influence, we must take into account the "fallacy of negative cases," that is, the tendency to exaggerate the importance of the few chance resemblances which do occur, while neglecting the overwhelming majority of cases in which no "mark" appears following striking maternal

impressions. Prenatal influences in the popular sense can be explained by two words, coincidence and suggestion.

On the other hand, prenatal environment in a different sense may, and indeed must, play an important part in the early development of the organism. The traditional scientific treatments of heredity from Weismann on, tend to ignore the effects of environment in such development, as if heredity alone were responsible for the formation of the new individual up to the time of birth, after which environmental factors could operate. As a matter of fact it is obvious, on a little consideration, that the organism has no meaning except in relation to environment. In the first place it is clear that there must be nutritive and respiratory relationships or else the individual newly formed out of the parental cells could not live and grow at all.

In the second place it appears that normal growth of the cells in the embryo involves a dynamic or energetic relation among these cells. We have seen that all the cells in the new individual at first have almost the same protoplasmic constitution, the same chromosome equipment. Yet after the first few cell divisions, differentiation occurs. The cells on the outer side form more or less distinct layers, and gradually differences of arrangement and structure appear within the mass of cells. These different layers and parts give rise to the various parts and organs of the body.

Now, Child and his students have pointed out that while this differentiation is going on each cell is being influenced *by the surrounding cells*.² That is, its development is dependent not merely upon hereditary factors within its own cell wall, but also upon stimulation from neighboring parts. We know that all protoplasm is irritable, *i.e.*, that it has

² CHILD, CHARLES M., *Physiological Foundations of Behavior*, chaps. i, ii, iii, and xii (Holt, 1924).

in some degree the property of conductivity, and so it is inconceivable that a cell could develop in isolation without being affected in a dynamic or excitatory way by neighboring cells.

There is, moreover, considerable experimental evidence that such a dynamic interrelationship is important in the early stages of development. In *Planaria* (flatworms) Morgan has shown that a piece of the animal taken from almost any part of the body may give rise to a head, and other experiments on regeneration in lower animals show that the development of a special organ is partly dependent upon its *relation to surrounding cells*, not merely upon inherited determiners within the cells. We may suppose, then, that in a very real sense the growth of the human embryo is also partly a function of the dynamic relationships among the various cells which at different stages compose it. These relationships are environmental, in the sense that each cell is affected by its own particular environment, and must respond to that environment adaptively if normal growth is to occur.

Thus even before birth, while the embryo is isolated from contact with the ordinary outside world, both hereditary and environmental factors are involved in normal growth. Hereditary potentialities exist in the newly formed cells, but dynamic as well as nutritive relationships with the "environment" are essential to their realization. After birth the situation is of course essentially the same — that is, hereditary and environmental factors continue to act jointly in determining the development which occurs. But in connection with the problem of heredity it is the prenatal environmental factors which call for special consideration, since these have been in the past so largely neglected.

In addition to the normal environmental factors which

operate in the prenatal development of every human being, there are special conditions, such as parental alcoholism and infection from certain diseases, which in individual cases may profoundly affect the embryo (or fetus, as it is called after the first month of gestation), and condition the appearance at birth or sometime after birth of mental or physical defects of varying degrees of seriousness. Thus in some cases a parental condition (for example, a venereal disease) is transmitted to the offspring as a disease may be communicated from one adult to another. Such congenital transmission, although of great interest and importance to the psychologist, is to be distinguished from germinal inheritance. In a later section of this chapter we shall discuss unusual or abnormal prenatal conditions which may affect the congenital equipment of the child.

The consideration that environmental conditions, both normal and abnormal, are important in prenatal as well as in postnatal growth, furnishes an additional reason for our inability to make accurate predictions about the appearance of a trait in the offspring of a given union. The determiners for a certain trait may be almost certainly present, but the trait may not actually appear owing to some fluctuations in the prenatal environment, some infinitesimal differences in the arrangements of cells, some lack or over-plus or defect in the supply of nutrition. A child may, for example, have inherited the germinal factors for tallness, but he will not actually grow tall unless normal conditions for development prevail, both before and after birth.

If prediction of physical traits is difficult in the case of the simpler animals, it is even more so for human beings. The chief reason for this is the difficulty of controlled scientific study of human heredity. Since human matings cannot be experimentally controlled, the scientist must rely

upon the study of chance matings. The smallness of the number of offspring from two parents, the extreme slowness of the reproductive process, the fact that the stock is always mixed, the necessity for including doubtful data from past generations—these considerations make all present conclusions as to the manner of heredity of specific traits in human beings open to question.

So far we have been dealing only with the mechanisms for the inheritance of individual or family traits. We have assumed the inheritance of the general features of the species and race. These general features are, of course, highly predictable. We know that the offspring of any human union will, if normal, have two legs, one nose, and other traits of the species. Such characters are not, it seems, determined by chance combinations of chromosomes. Experiments indicate that they are based upon the special constitution of the cytoplasm of the egg cell. Conklin says, "We are vertebrates because our mothers were vertebrates and produced eggs of the vertebrate pattern; but the color of our skin and hair and eyes, our sex, stature, and mental peculiarities were determined by the sperm as well as by the egg from which we came. The chromosomes of the egg and sperm are the seat of the differential factors or determiners of Mendelian characters, but the general polarity, symmetry and pattern of the embryo are egg characters which were determined before fertilization."³

While the simple physical traits common to the species will always appear in the normal offspring of a given union, it is exceedingly difficult, for reasons stated above, to predict what simple physical traits of an individual character will appear in the offspring of a human mating. Only for a few, the hereditary bases of which have been thoroughly studied,

³ CONKLIN, E. G., *op. cit.*, pp. 199-204.

is prediction now even roughly possible. Examples of such traits are albinism, blue eyes, and some types of deafness (regarded as recessive characters); and brown eyes and polydactyly (the presence of extra toes or fingers), all of which are regarded as dominant characters. If two blue-eyed people mate, the children will very likely, although not certainly, have blue eyes. If one of the parents has an extra toe or finger, one should not be surprised to find an extra toe or finger in one of the offspring. But even in the case of such traits the situation in the germ plasm is so complex that accurate prediction is impossible.

DO THE "LAWS OF HEREDITY" APPLY ALSO TO MENTAL TRAITS ?

IF A given bodily structure is inherited, so must be its general mode of functioning. A creature with wings will fly, one with good eyes will turn toward bright lights, one with teeth will chew its food, one with a complex retina of a certain type will distinguish colors. We have seen that mental traits always presuppose the functioning of definite physical structures. Hence the mental activity of an individual, as involving adaptive behavior, depends upon the possession of structures so constituted that they will function in certain ways in response to extraneous forces (stimuli).

To say that a mental trait is inherited can only mean, of course, that the physico-chemical conditions for its appearance are derived from the parental germ plasm. To say that a child has inherited feeble-mindedness, for instance, means that there were somehow present in the fertilized egg factors which set such a limit to the growth of the brain, that the individual is incapable of responding in a highly adaptive way to new situations. Similarly, to say that a child has inherited a talent for singing can mean nothing more than

that as a result of the combination of certain factors in the chromosomes, there was determined in the fertilized egg cell the later development of certain structures (perhaps delicate laryngeal muscles, unusual range of fibers or hair cells in the organ of Corti, and the like), which made possible the production of a wide range of clear tones. Or perhaps there were present in the germ cells factors which resulted in the development of specially "permeable" neural pathways such that the habit of singing could be very easily acquired.

We may say that such traits are inherited, meaning only that there is an actual transmission from the parents to the new organism, the fertilized egg cell, of the physico-chemical factors which as the individual grows develop into these structures, and set limits to their growth. Thus we say long "musical" fingers may be inherited, or a skin unusually rich in touch spots, or a thyroid gland which produces a less copious secretion than the average, or a retina which makes possible unusually clear vision, or a nervous system which conducts impulses with more than average quickness, or a brain with unusual number and complexity of neurons which makes possible remarkable ideational activity. It is apparent that mental traits cannot be inherited *as such*. The structural conditions for their development may be inherited, but whether the traits actually develop or not depends upon the presence of a favorable environment, from the time of fertilization onward. The same thing, however, holds true for the development of any structure.

This being the case, it seems mere verbal quibbling when writers like Watson state that "there is no such thing as the inheritance of talent or mental traits."⁴ Of course that is *literally* true, but so is the statement that eye-color is not

⁴ WATSON, JOHN B., *Behaviorism*, pp. 74-75 (People's Institute, 1924, 1925).

inherited—it is only the determining factors for the development of eye-color which are, strictly speaking, actually transmitted from parents to offspring. Even if the original structural factors are safely transmitted, they develop only under particular environmental conditions.

Thus the actual appearance of both physical and mental native traits depends upon both heredity and environment. From the first movements of the uniting nuclei of the male and female cells to the most complex reactions of the growing ten-year-old child, “heredity” and “environment” are jointly concerned. This is one of the obvious facts, the consideration of which is often neglected by laymen and scientists alike. Its recognition would resolve much of the obscurity that clouds debates between those who tend heavily to emphasize heredity, and the “environmentalists.” Clearly the only scientific thing to do is to study patiently the exact and detailed conditions of the development of different structures and different mental traits of the organism.

We now have, at last, a basis for answering the first of the two questions with which we are chiefly concerned in this chapter, namely, in the case of a given father and mother, what can be predicted about the mental traits of the children? If in the case of simple physical traits in human beings it is difficult, or in the case of most such traits even impossible, to predict whether they will appear in the offspring, it is clear that prediction of mental traits will be even more difficult. The chief reason for this additional difficulty is that mental traits are very much more complex. Involving, as they characteristically do, ever varying responses to complex and changing stimulating situations, it is very hard to analyze most mental traits, and to say in the first place which ones are inherited. Most of them,

when studied carefully, are seen to be complexes of simpler "traits" or characteristics, some clearly inherited, some acquired. In cases in which we do not know what the hereditary factors are, their prediction is obviously impossible.

It is apparent that both on account of their great complexity and the almost infinite possibilities for combination of the factors in the chromosomes, anything like even moderately accurate prediction of mental traits is impossible.

We can state only a few general principles which may serve as a guide to parents. In the first place, they may remember that each new individual will represent a unique combination of factors and that hence the child may manifest traits never known before in the family. They must be prepared for anything! In the second place, they may consider that if they themselves possess a given heritable trait which is very exceptional, they cannot expect their children to possess the trait in the same degree. Since the trait is unusual in the general population or any family line, it must mean that only a few of the many existent germ cells carry the determiners for that trait, and that the chances for reappearance in the offspring of the same combination that resulted in the parental trait, will be very slight indeed.

On the other hand, the fact that both parents possess the trait must mean that in the two parental stocks of germ-plasm there are more cells carrying the factors in question than among the general population; and so there may be more chance that some of the factors will combine to produce offspring possessing the trait to a greater degree than among the general population, although to a lesser degree than existent in the parents. This supposition might explain Galton's findings as expressed in his "law of filial regression," which he states as follows. "Each peculiarity in a

man is shared by his kinsmen, but *on the average* in a less degree. It is reduced to a definite fraction of its amount. . . The fraction differs in different orders of kinship, becoming smaller as they are more remote." Galton showed that this held for exceptional height, finding, for example, that sons of very tall men are taller than the average man, but deviate from the average height only one-third as much as the fathers.⁵

L. S. Hollingworth and M. V. Cobb carried out an investigation to see if this law applied to general intelligence as measured by tests and expressed in terms of intelligence quotients (*I.Q.'s*), which are numerical statements of achievement in the tests. Studying the siblings of a given group, they found that these brothers and sisters were much less exceptional in *I.Q.* than the original group.⁶ If this law of filial regression, which seems roughly to describe a genuine condition, applies to general intelligence, then parents of unusual intelligence should not be disappointed to find their children less intelligent natively than themselves, but may hope that they will have a mental endowment somewhat above the average.

Having discussed in general the question of the predictability of mental traits and shown that save within broad limits it is impossible, the next step is to deal with our second main question, namely, in a given child what mental traits, if any, may be said to be hereditary? Before doing this, however, it will be necessary to discuss the ways in which unusual or abnormal environmental influences may produce congenital traits.

⁵ GALTON, FRANCIS, *Natural Inheritance* (Macmillan, 1889).

⁶ HOLLINGWORTH, L. S., and COBB, M. V., "The Regression of Siblings of Children who Test at or above 135 I. Q. (Stanford-Binet)," *Jour. Educ. Psychol.*, 16: 1-7 (1925).

Conditions of Congenital Transmission. — Congenital transmission is often confused with germinal inheritance, but in order to know how to deal with a given condition, for example whether through medical treatment or through the regulation of mating, it is important to know whether it is of germinal origin or the result of special prenatal conditions. Hereditary traits, strictly speaking, are, to use Walter's definition, "those which have their *differential* conditions in the germ cells."

According to this definition we may speak of certain traits as inherited, though we have shown that environmental factors play a part in the genesis of all developed traits. And for the purposes of this discussion we may make the distinction between hereditary and environmental traits a matter of degree, regarding as hereditary those traits in which special hereditary factors have combined with usual environmental factors; and as environmental those in which special environmental factors have combined with usual hereditary factors.

Some traits, physical or mental, are the result of conditions outside of the germ cells or the developing embryo. A germ cell, either male or female, may be so injured before conception that the offspring arising from its union with another will be affected. This accounts for the fact that paternal alcoholism may in some cases affect the offspring. Probably, however, the most common type of special prenatal influence is exerted in the body of the mother after fertilization has taken place, through deficient supply of nutrition through the blood, or in other ways which we are about to discuss. Traits due to such influences are really of environmental origin in the sense that they are due to forces or conditions outside of the individual organism which is affected, although they act within the body of the mother.

We may speak of the effect of the intra-uterine environment on the prenatal development of the child.

A trait or condition appearing as the result of any prenatal environmental influence, whether it has affected the cell before fertilization or during intra-uterine development, may be called congenital, since the child either exhibits it at birth, or possesses at birth the peculiarities of structure or functioning which will later result in the development of the condition. Congenital traits are often called hereditary, but from the standpoint of social control, as will be pointed out shortly, it seems advisable to make a sharp distinction between the two terms. Such traits do not fulfill the condition imposed by the common definition of being due to differential factors in the germplasm.⁷

We have seen that while ordinary environmental factors play a part in normal prenatal growth and thus help to condition the later appearance of normal traits, there is no basis for the popular belief in special "prenatal influences." It is true, however, that just as normal nutritive and other factors result in normal development, so may disordered nutrition or other unusual environmental conditions result in retarded or abnormal development. Such special influences, prevailing before or at birth, may condition the later appearance of unusual or abnormal traits. These, though acquired as a result of special environmental conditions, may appear to be inherited.

We may discuss the special conditions which may produce peculiar congenital traits under seven main heads.

1. *Malnutrition of the Mother.* If the mother is seriously undernourished or malnourished, so that the em-

⁷ For definitions and explanations see WALTER, HERBERT E., *Genetics* (Macmillan, 1921); SOLOMON, HARRY C. and MAIDA H., *Syphilis of the Innocent*, pp. 36-37 (U. S. Interdeptl. Hygiene Bd., 1922); MYERSON; ABRAHAM, *Inheritance of Mental Diseases*, p. 309 (Williams and Wilkins, 1925).

bryo does not receive needed elements from her blood, the prenatal growth of the nervous system (as of other parts of the body) may not be normal. One result of such prenatal physical retardation is undoubtedly feeble-mindedness or mental defectiveness in varying degrees. Tredgold believes that while some acquired mental retardation is the result of malnutrition in the first years of childhood, much more is due to malnutrition during intra-uterine life.⁸

It is reasonable to suppose that not only mental defectiveness but also general weakness or lack of vigor may result from some of the many possible disturbances in nutrition. These conditions may sometimes underlie nervous instability, constitutional inferiority, and other psychopathic "tendencies" and "predispositions" which are likely to be attributed to germplasm heredity.

2. *Prolonged and wasting diseases* of various kinds may at times produce effects similar to those resulting from malnutrition. In fact some sort of malnutrition, as well as definite infection, is often associated with such diseases, which include among others tuberculosis, cancer, diabetes, and pellagra.⁹

3. *Toxins* may affect unfavorably the normal growth of the embryo. Inorganic poisoning by lead or phosphorus incident to certain occupations, sometimes affects intra-uterine development. Toxins produced by the action of bacteria in certain diseases are known to have definite effects.

Experiments on animals and observational studies of human beings show that excessive use of alcohol may have very deleterious effects on offspring. Since it passes through the bloodstream unchanged it may affect the germ cells directly; and so even if the mother does not use alcohol

⁸ TREDGOLD, A. F., *Mental Deficiency*, pp. 55, 296-299 (William Wood, 1908).

⁹ TREDGOLD, *op. cit.*, pp. 62, 230; MYERSON, A., *op. cit.*, pp. 42-47.

during the pregnancy the infant may be born weak and defective because the male germ cell was affected before union. Excessive indulgence in this drug on the part of the mother during pregnancy may seriously affect the prenatal development of the nervous system, as well as of the body as a whole. Mental defectiveness may be a result, or nervous instability and perhaps other conditions psychologically important. While in some human cases such effects of parental alcoholism seem clearly traceable, the evidence is not clear cut. Much more research is needed on the effect of size of dosage, length of indulgence, and many other points. Inferences as to exact effects in human beings cannot be based on experiments with animals; and serious difficulties are involved in statistical studies of human beings. Meanwhile, however, the knowledge that important mental effects may be related to parental alcoholism at the same time throws light on certain problems of supposed germinal heredity and suggests means of control through prevention.¹⁰

4. *Deficiency or excess of some glandular secretion* may be acquired before birth and condition later mental development. The most conspicuous example is afforded by congenital endemic cretinism. This involves markedly impaired physical development, with degrees of mental retardation ranging from mild feeble-mindedness to idiocy. The rare form of cretinism in which the thyroid gland is absent is thought to be hereditary, but most cases, Tredgold thinks, represent underfunctioning of the thyroid, which seems to be usually a result of environmental influence, probably by way of water or food supply. Cretinism is said

¹⁰ See ARLITT, ADA H., "Influence of Alcohol on the Intelligent Behavior of the White Rat," *Psychol. Review Monographs* No. 115, 1919; MYERSON, *op. cit.*, and PEARL, RAYMOND, *Alcohol and Longevity*, chaps. v, viii, and ix (Knopf, 1926). Pearl gives a bibliography of experimental and statistical studies.

to be especially common in certain regions—the so-called goitre regions. While very often congenital, the condition may also be acquired after birth.¹¹

It has been found possible in many cases to prevent or to check the development of cretinism, whether congenital or hereditary, by the feeding of thyroid extract. The results which have been achieved illustrate in a striking way the possibilities in the way of applying science to the control of human life. An infant who would otherwise become an idiot may be saved for society by the careful administration of thyroid. Cure is by no means always possible. In some cases, where treatment begins late, there may be physical recovery, but not a corresponding increase in mental ability. To be effective, treatment must be begun at an early age, and must be continuous. Tredgold, the English authority on mental deficiency, says, "On the whole, I think it may be laid down that, whilst in some cases cure may take place, if treatment be initiated not later than the third month, should the first year be allowed to pass without thyroid administration, the cretin, although improving to some extent, will seldom fully make up his mental arrears."¹²

5. *Infections.* The child may be infected before or at the time of birth with the germs of some disease which may either be present at the time of birth, or develop much later. The most striking example is juvenile syphilis. This is sometimes dormant for years and then may attack various organs or tissues of the body. When it attacks the nervous system it results, if not checked in the earlier stages, in progressive impairment of intelligent capacity ending in complete dementia. There is some indication also that parental syphilis may be a factor in feeble-mindedness, in epilepsy

¹¹ TREDGOLD, A. F., *op. cit.*, pp. 251-254.

¹² TREDGOLD, A. F., *op. cit.*, pp. 259-260.

or in "general nervous instability" in the offspring, although evidence on these points is uncertain. There is convincing evidence that motor defects such as paralyses and disturbances of gait, and sensory defects impairing vision and hearing, may be the result of syphilis in the parents. Thus many disorders in behavior which are sometimes erroneously attributed to germinal heredity, really represent congenital conditions resulting from syphilis either in the father or the mother. The parents may be perfectly healthy themselves, yet carry the germs of this disease and infect an unborn child.¹³ Another venereal disease which frequently impairs the sensory equipment of the offspring is gonorrhea. The infection in this case is apt to take place at the time of delivery and to cause "eye-trouble" which may develop into complete blindness. Such a result is prevented in the usual careful birth technique.

6. *Birth injuries.* Anatomical and hence mental growth may be influenced before or at birth through mechanical injury. Severe blows or falls may possibly cause such injury, but it commonly occurs at the time of delivery in the struggles of the child during difficult labor, or as a result of severe pressure on the soft bones of the skull through the use of instruments.¹⁴ Various forms of paralysis may result, or, though the child appears physically perfect, neural growth may be arrested and feeble-mindedness result. It was formerly thought that practically all feeble-mindedness was due to defective germplasm, but it is now believed that prenatal environmental conditions, including the effects of alcohol and other agencies as well as mechanical injury, account for a large percentage of it.

7. *Emotional experiences of the mother.* The future be-

¹³ SOLOMON, H. C. and M. H., *op. cit.*

¹⁴ TREDGOLD, A. F., *op. cit.*, pp. 27-30.

havior of the child may also, theoretically, be indirectly affected by abnormally exciting experiences of the mother during the prenatal period. Emotional seizures may affect the embryo through muscular contractions of the uterus and through change in the amount of blood supply. They may also, quite possibly, exert an effect through the glands. The secretions of maternal ductless glands are absorbed directly into the blood and hence will be carried through the blood stream of the embryo. Now there is evidence that glandular secretions have important effects on bodily growth and activity, and it is a real but theoretical possibility that they may also have important effects on temperament and personality. There is also some evidence that the quantity of the secretions from various glands varies according to the emotional state, although we do not know surely which glands are involved or just what is their effect.

Considering our present ignorance of the precise effects of emotional disturbances, especially upon glandular functioning, we must not take too seriously the wholly theoretical possibility that emotional experiences of the mother may condition, even indirectly, the mental traits of the child. One might suppose that in any case only extreme emotion, veritable seizures in fact, would produce an effect.

It is clear that although the popular theory of prenatal influences has no scientific support, there is a very genuine and important influence of both normal and abnormal prenatal conditions on the development of the child; and if our aim is to provide favorable conditions for normal growth, these must be taken into careful account. Feeble-mindedness or mental defectiveness may be due to factors in the germplasm, but in a good many cases it seems to be a result of excessive parental alcoholism, syphilitic infection, maternal malnutrition or injuries at birth. Certain

types of insanity may be related to such unfavorable prenatal influences, as paresis certainly is. Sensory and motor defects may be the result either of infection at birth or of birth injuries. The mentality of the child may be and frequently is profoundly affected by special conditions prevailing before birth.

Thus through regulation of environmental conditions with the aim of prevention, it seems that a considerable amount of control can be exerted in the matter of intelligence development, sensory and motor defects, insanity, and allied conditions. People who look forward to becoming parents may try to keep themselves free from venereal disease, refrain from excessive indulgence in alcohol, and so on. Even in case an individual has acquired a transmissible defect, proper medical treatment may often make him physically fit for parentage. Syphilis may be cured if taken early enough, for example, so that there need be no risk of infecting offspring.

From the point of view of social control, our present knowledge suggests important applications. If we call to mind that the chief "prenatal influences" known to be undesirable—malnutrition, alcoholism, venereal infection, and possibly extreme emotional excitement, besides mechanical injury at time of birth—are all more likely to be prevalent in a poor social environment than in a good one, it is seen that one socially important means of control is a general attack on the factors that make the environment poor. This would certainly, in the long run, be more effective socially than the prevalent method of dealing with isolated cases in which the effect of the poor environment has already been shown in the character of the offspring. Certainly eugenics or the "science of good living" which *develops* traits already present, is as important

in improving the character of the stock as eugenics, which may initiate desirable traits. Both eugenics and euthenics are necessary and important.

The student should remember that this is a discussion of the possible effects of abnormal environmental conditions before birth. Under ordinary circumstances none of these conditions prevail. If both parents are healthy and the mother is well nourished and lives normally during pregnancy, there is no reason for concern as to the condition of the embryo; certainly no reason to be worried about possible psychological consequences of parental behavior.

We are now in a position to deal with the common question raised at the outset of the chapter, "what mental capacities and traits depend upon germplasm heredity?" Parents are usually anxious to know what mental traits in their children are hereditary, because they believe that hereditary traits are somehow much harder to control than acquired traits, that they "will out" and so must to a degree be tolerated. The mother shakes her head when little Bobby obstinately refuses to give up a toy, saying to the caller, "What can we do—he's got his father's stubbornness?" When a little girl in a family is unusually nervous, or has temper tantrums, the father may grit his teeth and resolve to be patient about it, saying, "Poor little thing, she got it from her mother and her grandmother before her!" Parents may worry because their intelligent little son greatly resembles an aunt who died in an insane asylum, and may even, directly or indirectly, let the child know that they fear he will develop a similar kind of insanity.

Many psychologists have shared the popular conviction of the incurability of inherited mental traits. They have assumed, moreover, that it is possible to say of many such definite capacities or modes of behavior that they are either

inherited or acquired. A brief discussion of the criteria proposed for distinguishing native from acquired individual traits will help us to see whether these assumptions are justified.

CRITERIA PROPOSED FOR ISOLATING INHERITED INDIVIDUAL TRAITS

1. Existence from Birth or from an Early Age.—

This criterion, implied in many discussions of mental heredity, is here stated approximately in the wording of the British Mental Deficiency Act of 1913. The preceding discussion of congenital transmission shows that the fact that a condition or trait has existed even from the time of birth, does not prove that it is due to germinal inheritance. This is a criterion for the *native* character of a trait, but not its *hereditary* character. But the inclusion of the words "at an early age" makes this criterion unreliable even as a test of native traits. Many stable modes of behavior may be acquired very early, even in the first few months, or within, let us say, the first three years. Examples are a dislike of orange juice due to association with castor oil, or a timid manner due to frequent punishment and loud scolding. Later chapters will explain in detail the evidence for this early learning, the prevalence and importance of which have only in the last few years been recognized. Early acquired, such traits may function almost automatically, and may seem a part of the individual, but nevertheless may be definitely acquired. This criterion is therefore unsatisfactory.

2. Strength as Measured by Resistance to Attempts at Modification.—

Like the preceding criterion, this one corresponds to a traditional popular belief. There seems to be no decisive evidence in support of it. An example of a

trait exhibiting high resistance to treatment is what has been called moral imbecility. This is said to be the condition of a child who has normal intelligence but is incapable of normal feelings about the moral quality of his acts, and who still remains thus incapable after years of effort to awaken a moral sense.

The argument that since the condition cannot be cured it is hereditary, is decidedly open to attack. First, we might ask what methods are to be used, how early the attempt to cure must be begun, and how long continued, before a diagnosis of incurability is made. Second, we might point out that many traits known to be acquired become thoroughly ingrained and extremely resistant to attempts at modification. A friend of the writer's, trained to habits of puritanical honesty from childhood, tried once, on a dare, to steal a small tea cup from a Chinese restaurant, and in fact succeeded in getting out of the door with it. She was forced nevertheless to put it down in the first alley she passed. It would appear to be, conversely, next to impossible to make an honest man of an habitual liar. Third, modes of behavior generally considered to be inherited can be changed, and sometimes with relatively little difficulty. The "native liking" for orange juice, for example, may be rather readily changed to a dislike after a few experiences of taking it with castor oil. The chapter on Native Responses will make this point more clear.

3. **Correlation with Inherited Physical Structure.** — A child who has long legs will probably have the ability to run faster than a shorter companion of the same age. Long fingers are an asset in piano-playing, and small hands in petty thieving. Any trait or factor in a trait which can be shown to be definitely correlated with a physical structure which is inherited, is of course itself inherited. This

is a reliable criterion, but the trouble is, it is often very difficult to establish the correlation. For example it is known that there are constant individual differences in ability to discriminate within the different classes of sensation, and such differences are most easily explained as due to peculiarities in the structure of the sense organ. These peculiarities may be present throughout life, and are in most cases reasonably to be regarded as hereditary, but we lack specific factual evidence on the point. Some special defects in sensory capacity, such as color-blindness or partial tonal deafness, or insensitivity in certain skin areas, may of course be acquired, although there is excellent evidence from the study of family groups that color-blindness is usually hereditary, and the other defects, as well as excellencies or peculiar features of sensory functioning, may often be hereditarily determined also. Peculiarities of gait or of speech, or slowness or quickness (rate) of reaction, must certainly in many cases be the result of structural characteristics hereditarily determined. But for none of these traits do we have definite factual evidence of correlation with inherited physical structure.

One important type of mental condition has been shown to be definitely correlated with a type of inherited physical structure, namely idiocy and certain kinds of mental defectiveness, correlated with special types of defective brain.

This criterion is seen to be both reliable and useful, although not widely applicable.

4. **Greater Prevalence of the Trait among Relatives than among Non-Relatives.** — Just as a certain type of feature, let us say brown eye-color, is found to be much more common in a given family stock than in the population as a whole, so may it be with mental traits; and determination of a statistically significant prevalence among relatives is

reliable evidence for the presence of hereditary conditions, providing this prevalence cannot be explained in any other way. This is, however, just the difficulty. In the case of simple physical traits such as brown eyes or the possession of an extra toe, the determination is rather easily made. But mental traits, which are modes of behavior, are characteristically complex, and mental abilities which can be measured only through manifestations in behavior, are similarly hard to analyze. They are all much more subject to environmental modification than simple physical traits.

For this reason the greater prevalence of any mental trait among relatives may be explained as due in part at least to exposure to similar environmental influences. A certain way of handling a table knife may be prevalent in a family group, is likely to have been used by the grandparents as well as the parents, to be used by nearly all of the brothers and sisters, by fewer of the cousins, and by still fewer of the more distant relatives. In the same way and for similar reasons, we may argue, might we expect a nervous manner to be distributed, or fear of spiders, or musical ability. And these "traits," like table manners, may depend largely or entirely upon special environmental influences. The fact that this fourth criterion of inherited character is valid only if other types of explanation are excluded, makes it necessary to be very cautious in applying it to mental traits.

Under certain circumstances, however, the criterion is very useful—in fact it is the only one besides correlation with inherited physical traits which is reliable at all.* We may illustrate this point, and at the same time gain understanding of important theoretical problems of mental heredity, by analyzing in some detail investigations designed to throw light on the hereditary character of so-called general intelligence.

Is General Intelligence Hereditary? — Defining general intelligence provisionally as the ability to react adaptively to new situations, we may consider that it is shown in the degree of eminence attained by an individual. Thus the incidence of superior intelligence among the relatives of a given person known to be superior, may be roughly estimated by finding out how many are listed in *Who's Who?*, how many are rated as superior by independent judges, and in other ways. Now, a good many studies have been made which show a high proportion of eminent men among the relatives of such geniuses as Macaulay and Darwin, as compared with the proportion in an unselected group. But of course it may be argued that social environment and education account for the superiority, rather than heredity. The same thing may be said of the biographical studies made by various investigators of the relatives of children who make high scores in intelligence tests.

Investigations of the families of gifted children when made objectively by means of mental tests are more significant than those utilizing the methods just discussed. Such investigations, made by Terman and others, show that among siblings of very superior children there is a much greater percentage of "genius" as indicated by tests than among the population at large.¹⁵

That this finding does not prove that high intelligence is due to heredity, a brief analysis of the nature of the tests and the method of scoring will indicate. The Terman (Stanford)' tests, revised from a series originally invented by Binet in 1905, consist of a large number of simple problems — words to define, numbers to repeat, stories to interpret, puzzles to solve, and the like. The method of fixing

¹⁵ TERMAN, LEWIS M., *Genetic Studies of Genius*, Vol. I, *Mental and Physical Traits of a Thousand Gifted Children*, chap. v (Stanford University, 1925); HOLLINGWORTH, LETA S., *Gifted Children*, pp. 169-173 (Macmillan, 1926).

the age standards was as follows. Quite a number of children of a particular age, say eight years, were given the tests, beginning with the easier ones. It was then determined what was the average number of tests these children passed successfully. Assuming this particular group to be typical of eight-year-old children in general, a certain range of achievement on either side of this average was set as being the normal range for eight-year-olds. Hereafter any eight-year-old child whose test record fell within this range was said to be normal. If his score in the tests was the same as the average score for the standard group, he was said to have a mental age of just eight. For every test he passed, a certain fraction of a year's credit was added to the mental age already earned. If a child failed to pass enough tests to reach the previously determined standard range, he was said to be under age, or mentally below normal. Thus a given eight-year-old child might be able to reach only the six-year average, and no higher. He would then be said to have a mental age of six or to be two years retarded mentally. If a child succeeded in passing tests above the standard set for his age, he was said to be over age, or mentally above normal. A mathematical expression of any child's performance as compared with others of his age is obtained by finding the ratio of his mental age to his chronological age. This is the intelligence quotient or *I.Q.* The child of eight who passes enough tests to earn a mental age rating of ten, thus has an *I.Q.* of $\frac{10}{8}$ or 125, the decimal being usually omitted.

This description of the intelligence tests most commonly used makes it clear at once that the *I.Q.* is not a direct measure of inherited intelligence, but that it depends in part upon acquired knowledge, and particularly upon ability to handle language.

The argument is advanced that the tests nevertheless do give a measure of inherited intelligence, because they are of such a nature that it can be assumed that all children brought up in a given country under normal conditions will have had the opportunity to acquire the abilities in question. If they have not done so for a significant number of the tests, this indicates to that extent inferior native ability.

This argument is in part fallacious. We may indeed, let us say, expect that most children will be exposed to the same general type of home and school training. But there must be many exceptions. Social and racial status, as well as lack of encouragement at home, poor health, lack of incentive, or other personality handicaps, have all been shown to be, in individual cases, factors in inferior performance on the tests. We are beginning to realize the importance of the fact that even children brought up in the same family are subject to differing social "environments." We know that many subtle influences, acting prenatally or postnatally, may affect intelligence. In fact, to suppose that intelligence in general may be usefully considered either hereditary or acquired is highly illogical. We have seen that any capacity is a matter of both heredity and environment. In one child hereditary factors may be more important in determining the developed trait, in another, environmental factors. For example, in one an *I.Q.* of 60 may possibly be due largely to an inherited defective cortex, while in another child the same *I.Q.* may be due to malnutrition in infancy. In one child an *I.Q.* of 85, indicating "dullness," may be due to hereditary conditions different from normal, while another child may make an *I.Q.* of 85 rather than 100, because he has lived in a social environment much inferior to the average.

Thus it appears that we can not say that intelligence (or any other "trait" for that matter) is as such either hereditary or acquired. It is always both; and the problem is not whether it is hereditary *in general*, but to what extent *differences* in intelligence from individual to individual, are due to hereditary or to environmental differences. As shown in the above illustrations, some of these differences are due to hereditary factors and some to environmental factors. Every comparison must be made independently.

These considerations weaken the position of those who hold that because some individual cases of very low or very high *I.Q.* are determined primarily by inherited conditions, therefore so are all intermediate degrees of intelligence as expressed in *I.Q.* Statistical studies of family groups are often cited as factual evidence. The *I.Q.*'s of siblings are found to resemble each other much more closely than those of unrelated children. The degree of similarity is expressed by a number, called the coefficient of correlation. If we compare the *I.Q.*'s of fifty children with the *I.Q.*'s of fifty others who are their siblings, and if on the average each child's *I.Q.* is very close to that of his brother or sister, then the correlation will be positive and high, approaching one hundred. If instead each child's *I.Q.* were as likely to be lower than that of his sibling as higher, that is if there were no similarity, the correlation would be zero.¹⁶

As a matter of fact numerous investigators have found significant positive correlations between the intelligence quotients of siblings, and still higher correlations between twins. With various types of mental tests correlations have been found varying from about $+.25$ in the case of cousins (Dexter) to $+.80$ for twins (Thorndike). Willoughby

¹⁶ The student unfamiliar with the use of the correlation method should be referred to some such simple treatment as that of DASHIELL, JOHN F., *Fundamentals of Objective Psychology*, pp. 564-567 (Houghton Mifflin, 1928).

found that family similarities in mental-test abilities resulted in an average positive correlation of $+.40$.¹⁷

Since for unrelated children taken at random correlations on such tests would be zero, these figures are often interpreted to mean that the test achievements are due to inheritance. It is evident, however, that these investigations have not excluded the influence of social and other environmental factors. Brothers and sisters have a more similar environment than cousins, and twins a more similar environment than ordinary siblings.

One way of trying to measure the effect of environment is to compare the degree of similarity of identical twins, produced from the same egg and fertilized by a single sperm and hence with the same chromosomal equipment, with that of fraternal twins coming from different egg cells, fertilized by different sperms. There is some difficulty in distinguishing the two types but Professor H. H. Newman of Chicago seems to have worked out really accurate methods. Therefore it may be assumed that any differences found between identical twins will be due to environment (nurture), while differences between fraternal twins will be due to both hereditary and environmental factors. A group of Chicago investigators, including besides Professor Newman, F. N. Freeman, Mrs. Bryan Mitchell, and K. J. Holzinger, are now at work on twin differences. Holzinger has given a report on physical and psychological measurements of fifty pairs of identical twins as compared with fifty-two pairs of fraternal twins.¹⁸ The following table gives some typical correlations which were obtained. Of the

¹⁷ See the studies in the section on "Family Resemblance," in the *Twenty-Seventh Yearbook of the Natl. Soc. for the Study of Educ.*, pp. 41-99 (Public School Publ. Co., 1928).

¹⁸ HOLZINGER, KARL J., "The Relative Effect of Nature and Nurture Influences on Twin Differences," *Jour. Educ. Psychol.*, 20: 241-248 (1929).

traits named, "Woodworth-Mathews" refers to a questionnaire about "nervous" habits. It is considered that in general the higher the score on this questionnaire the greater the tendency to emotional instability.

TABLE OF CORRELATIONS (AGE CONSTANT)		
Variable	Identical N 50 (pairs)	Fraternal N 52 (pairs)
Standing height .....	.93 \pm .01	.65 \pm .05
Binet IQ .....	.88 \pm .02	.63 \pm .06
Word Meaning .....	.86 \pm .02	.56 \pm .06
History and literature.....	.82 \pm .03	.67 \pm .05
Woodworth-Mathews .....	.56 \pm .07	.37 \pm .08
N = No. of cases.		

The correlations for identical twins indicate in the first place, since they are less than one hundred, that environmental factors have produced differences between the members of the pairs. This influence is most apparent for "emotional stability," less so for school achievements and intelligence test scores, and least so for such traits as height. The typical correlation is high — about $+.90$, the author says.

In the second place the consistently lower correlations for fraternal twins (average about $+.60$) are evidence that the differences between these pairs are in part due to differences in heredity. The data make possible a statistical comparison of the relative effects of nature and of nurture in producing these differences. Holzinger after working out such comparisons concludes that nature is about equally effective with nurture in producing mean twin differences.

Undoubtedly the most valuable way of isolating the effect of environment would be to compare groups of children of the same heredity, brought up in different environments;

or groups of children of different heredity, brought up in the same environment. Finally a measure of the effect of a more favorable environment on intelligence test scores could be obtained by testing a group of children before subjection to the favorable environment, and again after they had lived in it for some years. Only recently have such crucial investigations, using foster children as subjects, been carried out, one by a group in Chicago, Frank N. Freeman, K. J. Holzinger, and Blythe C. Mitchell, the other by Barbara S. Burks of Stanford University. We shall present briefly, here, the results of the more extensive Chicago study of 671 children.¹⁹

Groups of children were tested before placement, and again after several years in a good foster home. One such group of 74 children, after an average residence of four years in the foster home, made a significant gain in intelligence test score. The authors present data to show that this gain represents about seven *I.Q.* points and believe it is good evidence for a rather striking influence of environment on intelligence. (Hereafter when we say intelligence we shall always mean intelligence test score.)

Another test involved a comparison between siblings who had been brought up in different foster homes. Siblings do not of course have the same heredity, as do identical twins, but the fact that a number of investigations agree in finding a correlation of about $+ .50$ between sibling pairs, while it is zero for unrelated pairs, makes comparison possible. The correlation in intelligence between 125 sibling pairs who had been separated in different foster homes from four to thirteen years was $+ .25$, much less than for siblings

¹⁹ FREEMAN, FRANK N., HOLZINGER, KARL J., and MITCHELL, BLYTHE C., "The Influence of Environment on the Intelligence, School Achievement, and Conduct of Foster Children," *Twenty-Seventh Yearbook of the Natl. Soc. for the Study of Educ.*, pp. 103-217 (Public School Publ. Co., 1928).

reared in the same home. This indicates clearly that home environment as well as hereditary factors is important in determining the test score.

The conclusion is supported by the fact that correlations between *I.Q.*'s of unrelated children brought up in the same home ranged from $+.25$ to $+.37$; and that a correlation of $+.37$ was found between intelligence of the children and intelligence of their foster parents as measured by the Otis test for adults. The foster homes were rated on material environment, evidences of culture, and education; and a correlation of $+.48$ was found between home rating and intelligence of foster children.

The investigation of Burks supports that of Freeman and his associates in indicating that residence in a superior foster home increases the intelligence of children, although she did not find quite so marked an effect. She believes that her data indicate that the extreme degree to which the most favorable home environment may enhance the *I.Q.*, or the least favorable environment depress it, is about 20 *I.Q.* points.²⁰

These two studies, while showing that in some cases environmental factors are very important, point to the existence of a strong and more or less stable hereditary basis for intelligent behavior. We must remember that the correlation between unrelated pairs of children is about zero. It is also true that, whatever later studies may reveal, these two very careful investigations, which make use of the only possible method we have of measuring environmental influence directly, will stand as important evidence of the potency of

²⁰ BURKS, BARBARA S., "The Relative Influence of Nature and Nurture upon Mental Development: A Comparative Study of Foster Parent—Foster Child Resemblance and True Parent—True Child Resemblance." *Twenty-Seventh Yearbook of the Natl. Soc. for the Study of Educ.*, pp. 219-316 (Public School Publ. Co., 1928).

home environment in influencing intelligence. If it be argued that the *innate* intelligence of the foster children remained the same, while the scores only increased, we may ask what is the use of trying to deal with hypothetical fixed conditions which can never be measured? Intelligence as we know it in actual life involves concrete adjustments in new situations, and it is the effectiveness with which these can be made that should interest us. This position is in line with the observation that all traits and capacities must necessarily involve both hereditary and environmental factors, and since it is impossible to find any one trait which is either purely inherited or purely acquired, the logical course, in fact the only thing we can do, is to deal with the trait or condition as we find it. It will be important for purposes of control to find out to what extent deviations from the average may be the result of environmental or of hereditary conditions, and this we can do by means of such methods as comparisons between identical and fraternal twins, and between various foster and own children groups.

As far as general intelligence is concerned, our discussion has shown that hereditary factors are very important in determining differences between individuals, equally clearly that in some cases environmental factors are very important, and above all that in every individual child intelligence is a matter of both heredity and environment. In the light of these considerations it is clear that to say that intelligence in general is either hereditary or acquired, would be a meaningless statement. Moreover, in so far as it may lead either to a fatalistic or to an over-optimistic attitude toward any one child, it is misleading. Each child must be judged as an individual. An *I.Q.* carefully obtained will give a rough measure of his present intelligent capacity as compared with that of other children of his age. But it will not tell what

the *I.Q.* might have been had other environmental conditions prevailed since conception; nor will it in all cases enable us to predict future intelligence status. The *I.Q.* is roughly constant from year to year, but there are many individual exceptions.²¹

We have taken one complex mental trait to illustrate the difficulty of the problem of determining the importance of environmental factors. The general statements we have made about intelligence will apply, with modifications, to any mental trait. Degree of emotional stability, for example, must always be affected both by heredity and by environment. Differences in such stability we may expect in some cases to be due to environment different from the normal, in others to hereditary make-up that is different from the normal. Holzinger's study indicates that environmental factors have more influence on stability as measured by the Woodworth-Mathews questionnaire than on intelligence. But extended experimental study will be necessary before we can estimate the possible rôle of environmental factors in this complex trait.

It is clear that any mental trait we can think of will always be dependent both upon hereditary and environmental factors. We may more easily keep this fact in mind if we consider various ways in which such a simple physical trait as height may be modified. The relative strength of heredity or environment in determining differences from the normal may clearly vary considerably from individual to individual. It will vary also from trait to trait. In some, as for example, intelligence, investigation may show that hereditary factors are usually very important. In others, as for example fears of specific objects, study may show

²¹ For brief presentations of opposing views on this subject, see Terman, L. M., *The Measurement of Intelligence*, especially p. 68 (Houghton Mifflin, 1916); and Carr, H. A., *Psychology*, *op cit.*, chap. xvii, pp. 411-424.

that environmental factors predominate. But any general statement in percentages about the relative importance of either heredity or environment for mental traits in general or for any one trait, is bound to be misleading. In order to understand any mental trait in any child, we must study patiently the conditions of the origin and development of the trait in that particular child. Generalizations will be helpful as guides in this study, but they will not settle the status of any particular case.

Thus we see that the second question raised at the outset of this chapter, namely in any given child what mental traits may be said to be hereditary, is not a significant one. In the first place it cannot be truthfully answered. No trait is either hereditary or environmental for all children, and it would be impossible to draw up a list of hereditary mental traits which would not create false impressions. In the second place in discussing criteria for inherited traits we saw that the assumption which usually prompts the putting of this question, namely that inherited traits are difficult or impossible of "cure," is not well grounded. This point will be more fully brought out in later chapters. It is worth while and in some cases very important to find out to what extent the development of traits may be influenced by hereditary or environmental differences, for such knowledge will influence our method of dealing with individuals. For example, knowing that an unfavorable environment may depress the *I.Q.* considerably, we shall be anxious to give all children the best possible chance, providing for example for adequate nutrition, especially during the prenatal period and early infancy. Having found that some types of mental defectiveness depend on germinal factors, we shall discourage procreation of individuals "carrying" this defect. Having found that fear comes to be aroused in special situations

because of peculiar individual experiences, we shall try to guard children against such experiences. And so on.

Meanwhile we must remember that idiocy acquired as a result of a birth-injury may be just as incurable as inherited idiocy, that an acquired habit of lying is as difficult to deal with as an inherited tendency to cry aloud whenever hurt. Not merely "acquired traits," but traits in which hereditary factors are important are susceptible of control — of eugenic or remedial medical control, if not of control through training. In short modern psychology offers no excuse for a fatalistic attitude toward individual human traits — it merely points to the need for careful analysis and accurate knowledge as a basis of control.

CHAPTER III

PHYSICAL AND MENTAL GROWTH

The development of all of these psychical faculties runs parallel with the development of bodily structures, and apparently the method of development in the two cases is similar, viz., progressive differentiation of complex and specialized structures and functions from relatively simple and generalized beginnings. Indeed the entire organism, structure and function, body and mind, is a unity, and the only justification for dealing with these constituents of the organism as if they were separate entities, whether they be regarded in their adult condition or in the course of their development, is to be found in the increased convenience and effectiveness of such separate treatment.

—E. G. CONKLIN.

IN ORDER to understand the mental adjustments of adults it is necessary to take account of physical and physiological factors. Carr has pointed out that there is a continuous organic background of mental life, a background which is important in determining motives, moods and emotions, as well as temperament and the development of character.¹ For the mental life of children this organic background is particularly important, since the child is continually undergoing growth changes, some of which are marked and striking. What a young child is able to do or say or think

¹ CARR, HARVEY A., *Psychology*, chap. xii (Longmans, 1925).

depends to a considerable extent upon the stage of growth he has attained.

PRENATAL GROWTH

WE HAVE seen in the preceding chapter that the life of the child begins with the union of the male and the female cells, that the first period of growth consists in successive divisions of the fertilized cell, resulting in the formation of a loosely cohering mass of cells, and that after this mass has assumed the form of a hollow sphere (blastula) it becomes attached to the wall of the uterus and continues its independent embryonic development. Now after the attachment of the blastula to the uterus, the layers of differentiated cells into which it has become divided begin rapidly to develop into the various organs of the body. The nervous system is early developed from the outer layer, and grows at a more rapid rate than the other parts of the body. At birth it has already attained one-fourth of its adult weight, while other parts have reached only from one-tenth to one-fourteenth of their adult weight.² All the organs are more or less completely formed, and some also begin gradually to function, long before birth,³ an event which thus marks not a sudden and radical change in mode of functioning, but a transitional adjustment to other environmental situations. Hence during the period before birth the child is not only "vegetating" but behaving.

The question is sometimes asked whether the newborn child has a mind. Of course he has, if we consider that mind involves essentially the capacity for reacting adaptively to stimuli. Even if we applied the term "mental" only to that

² WOODROW, HERBERT, *Brightness and Dullness in Children*, 2nd ed., p. 67 (Lippincott, 1923).

³ HOWELL, W. H., *Text-book of Physiology*, 8th ed., pp. 989-990 (Saunders, 1922).

adaptive activity which has been learned, we should have to recognize that some prenatal behavior may be mental, for it is reasonable to suppose that there are significant modifications of behavior patterns, involving genuine learning, during the later months of gestation.⁴ But whatever mentality the child has at birth is certainly very simple. The baby reacts only in the most elementary way, in the satisfaction of fundamental vital needs, and these would not be satisfied without adult care. Concerning the nature of the infant's consciousness at birth it seems profitless, for scientific purposes, to speculate. We can never get introspective data on this point, and reasoning from analogy is logically unsafe. Whatever opinion we may entertain on this interesting subject, it is clearly possible, using objective methods, to trace the chief steps in mental development without considering it at all.

If the question be asked at what point, during the complicated prenatal development of structure, mind originated, we can only point out that under our definition, it could not be said to originate at any one point. Even before the differentiation of the neural tissue itself, not to speak of the appearance of neural "pathways," there is an elementary sort of adaptive behavior. Just as in the course of animal evolution we find primitive mental activity long before a nervous system proper is evolved, so in the development of the embryo from the fertilized egg do we observe a very gradual progress from the simplest response in the single cell to those definite reactions of the embryo which appear clearly to be mediated by neural arcs.⁵ Even though for the sake of convenience we deal separately with the develop-

⁴ See chap. iv.

⁵ See PARKER, GEORGE H., *The Elementary Nervous System*, chaps. i and xiv (Lippincott, 1919); CONKLIN, EDWIN G., *Heredity and Environment*, 5th ed., pp. 36-56 (Princeton Press, 1922).

ment of structure and function, we must not forget that they always develop together as different aspects of one process.

During the period of prenatal growth just as the various structures become more and more complex, so the fundamental functions of metabolism, reproduction, movement, and irritability are performed with increasing effectiveness. Finally such a degree of differentiation of tissue and specialization of function is reached that we begin to see similarity to human activity. The function of irritability, at first subserved indifferently by the whole mass of tissue, comes to be especially, though not exclusively, related to definitely neural structures. But these develop by very gradual stages from non-neural structures, and it would be as illogical to date mental activity in the human being from the appearance of neural tissue in the embryo, as to date the appearance of mental activity in the animal kingdom from the first appearance of a kind of tissue that most anatomists would call neural. On the other hand, if the organism is a unity, and structure and function develop together, we might say that mental development, in a certain sense, begins with the union of the two parent cells, that is, with the life of the individual child.

POSTNATAL GROWTH

A PERSON is a physical organism behaving, and it may be said that his behavior at every step will be modified by responses to internal organic changes that are taking place. He is never free from this influence whether he knows it or not. A child who has become weak and lacking in bodily vigor will not only feel differently (have different intraorganic sensations), but he will behave differently. A

baby which is about to cut its first teeth may respond to the internal stimuli involved by changes in behavior long before the teeth actually appear. The adolescent boy whose voice is just breaking is literally more "self-conscious" because he experiences new and strange sensations connected with stimuli from the growth of new structures. His awkward behavior is in part a response to such new stimulation. As new muscular and other body tissue is added, so are new kinaesthetic and other intraorganic receptors, and these are connected by the growth of new fibres with the central and autonomic nervous system. A consideration of the general nature and the chief stages of general bodily development is thus seen to be essential as a background for understanding mental development.⁶

General Bodily Growth. — During the first year, growth is extremely rapid, the baby gaining an average of about five ounces a week, doubling his weight at six months and tripling it at one year. During this year the child gains enormously in strength and in motor agility. Although the rate of increase in weight is not quite so high after the first year, there is still very rapid growth until three, and then a slight slackening between three and five. (See Fig. 4.) Thus especially during the first three years, the child is continually subjected to new stimulation from his own growing body as well as to external stimulation arising from his active exploratory movements.

The curve of general bodily growth as measured by weight and height rises regularly and steeply from three to about twelve. There is a rapid acceleration in both height and weight (the "awkward age") between twelve and fourteen, which is one feature of the pre-pubertal changes that

⁶ For a convenient summary of the chief facts about the physical growth of the child, see Terman, Lewis M., *Hygiene of the School Child* revised ed. (Houghton Mifflin, 1929).

gradually result in a marked alteration of physical structure. At the same time, of course, definite and important internal growth changes are taking place. The curves for height and weight continue to rise until about seventeen, when the adult level is reached.

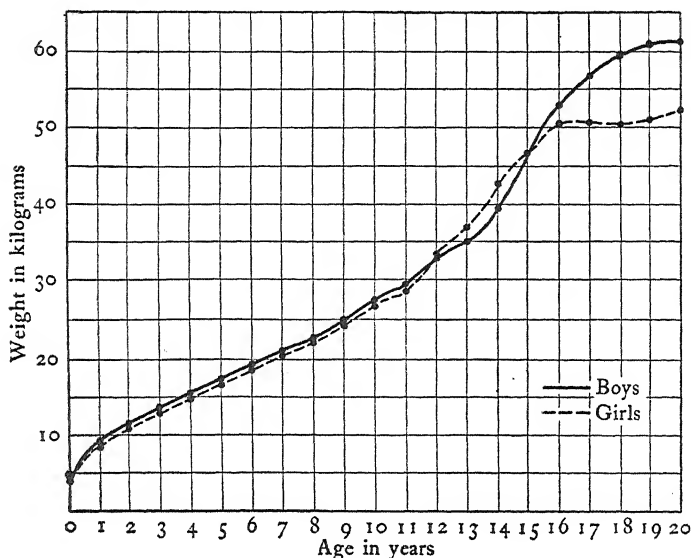


Fig. 4. GROWTH IN WEIGHT FROM BIRTH TO YEAR TWENTY

The curve for the first five years is based on data from measurements of 18,770 boys and 18,188 girls, reported by B. T. Baldwin, "The Physical Growth of Children from Birth to Maturity," *Univ. of Iowa Stud. in Child Welfare*, Vol. 1, No. 1, 1921. The curve for years six to twenty is based on data from measurements of 8042 boys and 6886 girls, as given by Wm. W. Hastings in *A Manual for Physical Measurements* (Springfield College, 1902).

Individual Differences in Rate of Bodily Growth.—

In considering these general growth changes it is important to call attention to certain facts in connection with both individual and sex differences in rate of growth. The fact is well known, though often neglected in the practical treat-

ment of children, that children of the same chronological age may differ considerably in amount of physical development already attained. The term "anatomical age" is used to refer to the degree of physical development which is average for a given chronological age. A child is said to be retarded anatomically if he has not reached the average level of physical development for his age, and anatomically advanced if he has reached a more advanced stage of development than the average child of his age. Common measures of anatomical age are dentition, ossification of the wrist bones, and pubescence, and these are held to be considerably more important as indications of rate of physical growth than height and weight, which are rougher measures apparently considerably more influenced by fluctuations in nutrition and general health.

Careful age standards have been established for all these three measures, and by their use it has been shown that children of the same age in years may differ enormously in anatomical age. To illustrate the variation in dentition, we may cite Woodrow's statement that the upper central incisors sometimes appear as early as the age of five years and three months, and sometimes as late as nine years and nine months. Hence there is a range of four years and a half.⁷

An investigation by Severson of Minneapolis (suggested and reported by Woodrow), reveals among ten-year-old school children striking differences in anatomical age as measured by the development of the carpal bones. Among one hundred ten-year-old children there were stages of anatomical development ranging from that shown by an average child of about eight to that shown by an average child of about fourteen. Thus in these children, all ten

⁷ WOODROW, H. E., *Brightness and Dullness in Children*, chap. vi.

years of age, there was a range of anatomical development as measured by ossification of the wrist bones of about six years. Daniel A. Prescott in 1923 reported "tremendous variability" in anatomical age as measured by carpal development, among individuals of the same chronological age. In a group of six-year-old boys he found a range of at least five and one-half years.⁸

When stage of pubescence is taken as an index of anatomical age, equally striking differences in children of the same chronological age are found. Crampton found, for example, that among 4800 boys, pubescence occurred in some as early as twelve and a half years, and in others as late as seventeen and a half years. Here we have again indicated a range of about six years in anatomical age. Leta S. Hollingworth says that about fifty per cent of white girls in the United States menstruate first between twelve years six months and fourteen years six months of age; that a fourth of them menstruate earlier than twelve and a half years, a few as early as nine years, and that the remaining fourth menstruate after fourteen and a half, some not until they are twenty or older.⁹

When we consider that these three different measures of anatomical age all correspond closely in a given child to each other and to general bodily development, it becomes at once apparent that a knowledge of the stage of anatomical development of a particular child is very important for any one who wishes to understand his moods and feelings, as well as his overt behavior. A mere knowledge of his

⁸ WOODROW, *op. cit.*, p. 109; PRESCOTT, DANIEL A., *The Determination of Anatomical Age in School Children and Its Relation to Mental Development*, pp. 34-39 (Harvard Monographs in Education, No. 5, 1923).

⁹ CRAMPTON, C. W., "Anatomical or Physiological versus Chronological Age," *Ped. Sem.*, 15:232 (1908); HOLLINGWORTH, LETA S., *The Psychology of the Adolescent*, p. 2 (Appleton, 1928).

chronological age is not enough to tell us what stage of physiological development he has reached. One ten-year-old girl, for instance, of a given height and weight, may be profoundly disturbed, inwardly, as a result of growth changes incident to pubescence, while another of the same age and similar general appearance may be still entirely unaffected even by the approach of such changes.

The fact is well known and often intelligently taken account of that girls reach puberty about two and a half years sooner than boys, but as Woodrow says, "It is not so commonly realized that this difference between the sexes in anatomical age is well marked by the end of the first year of life, and that it is present in ever increasing degree from the first year up to and beyond the age of puberty."¹⁰ That this is true, he says, has been shown by the use of all three measures of anatomical age, which closely agree as indices of general bodily development. Even in the second year of life the difference begins to appear, the girl of one and a half being anatomically as old as the boy of two. At seven and a half the average girl has reached the same stage of anatomical development as the boy of nine, and at puberty the girl of twelve and a half has reached a stage not attained by the average boy until fifteen. Prescott's findings for a large number of cases indicate that girls are about eighteen months ahead of boys throughout the whole period of growth from the age of six years to maturity.¹¹

Consistent as are these sex differences in physiological development, they are not nearly so large as individual differences within the same sex. It is not safe to conclude in a particular case, when comparing a boy and a girl of the same chronological age that the girl is necessarily more de-

¹⁰ WOODROW, *op. cit.*, pp. 103, 104.

¹¹ PRESCOTT, *op. cit.*, p. 39.

veloped physiologically. Figure 5 illustrates how striking individual differences in anatomical age may be, and implies the desirability of an accurate knowledge of the development of the particular child under consideration. It should be remembered that mere inspection is not enough to establish anatomical age, particularly since height and weight are rather unreliable indices.

Growth of the Nervous System. — The nervous system increases more rapidly in weight after birth than the rest of the body. It has attained one-fourth its adult weight by the time of birth, and nine-tenths its adult weight by the age of six. The number of cell bodies is complete at birth, and the neurones grow, up to physical maturity, through increase in size and in richness of terminal branching. A small part of the growth of the nervous system consists in the "medullation" of fibers which at birth have not yet acquired the characteristic fatty white sheath, or medullary sheath. Medullation of cortical fibers continues during infancy, through childhood, and even, it seems, into middle age.

In general we know little of the psychological significance of this postnatal neural growth. The fact that in congenital idiocy cortical cells are scantily branched, suggests that increase in richness of branching of the neurones is one basis for the growth with age of intelligence (in the sense of capacity for intelligent behavior). Increase in gross weight would not seem to be closely correlated with such growth of intelligence, since it has been shown that there is no significant relation, in adults, between brain-weight and intelligence as measured by tests. Medullation may be necessary to the functioning of the neurones, and if so, part of the growth in complexity of mental activity in general may be dependent upon increasing medullation. It



Fig. 5. CHILDREN OF THE SAME CHRONOLOGICAL AGE BUT DIFFERING IN ANATOMICAL AGE

These children are all 13 years of age, and all above *I.Q.* 130. The range in anatomical age is at least four years, and the range in educational accomplishment is three years. They show marked differences in social maturity as indicated by social attitudes and participation in social activities. [Reproduced by permission from Baldwin, "Methods of Selecting Superior or Gifted Children," chap. ii, in *Twenty-Third Yearbook, National Soc. for the Study of Educ.* (Pub. School Publ. Co., 1924).]

is thought that the helplessness of the newborn infant is connected with the fact that great tracts of fibers connecting the cerebral cortex with centers in the spinal cord are unmedullated at birth.

Since we are ignorant of the precise relation between neural growth and the development of mental capacities, it is clear that nothing we know about brain growth justifies any inference as to the ability or lack of ability of a child of a given age to profit by teaching. We could not say, for example, as some writers in the past have said, that children under ten lack "reasoning power," if by reasoning power we mean the possession of the necessary neural equipment. The only way to find out if children reason is to try to teach them to. There has perhaps been too much fear, among some people, of "forcing" a child by giving it intellectual tasks "too hard for its undeveloped brain." Undoubtedly some children are given tasks too hard for them; but probably we need not fear that we shall be "forcing" the child or "straining his mind" so long as his general bodily and social development is normal, so long as he is healthy and takes an eager interest in his work and play.

GENERAL FEATURES OF GROWTH DURING CHILDHOOD

SINCE behavior involves the functioning of physical structures, the growth of various mental abilities during childhood must be closely related to physical growth. The ability to react adaptively and to learn new modes of behavior, as directly dependent on physical growth, will be reflected in attainment, in the number and richness of the modes of behavior which the individual has acquired. It is impossible, of course, to measure sheer capacity, but indirect meas-

ures may be obtained by finding out the limit beyond which practice in any function does not result in improvement. If, for example, a ten-year-old boy, after much practice with his finger, can tap so many times in a thirty second interval, and if no amount of further practice enables him to make a better record, we may assume that he has reached a "physiological limit" determined by stage of growth in physical structures. But even when such a test has not been applied, steady growth in a given line from year to year, on the part of a large number of children, must be understood to be partly dependent upon physical growth. In this sense increase in memory span (number of digits which the individual can repeat after another, from memory) or increase in mental age from year to year, represents structural growth as well as a certain kind and amount of experience.

When we measure in various ways growth in capacities as reflected in attainments, we find, as we should expect, that throughout childhood mental growth exhibits the same general features as physical growth. Of the general characteristics of development to which Hollingworth has called attention,¹² we may discuss four as particularly important for child psychology.

1. All growth, mental as well as physical, is determined partly by hereditary and partly by environmental factors. — That certain hereditary factors set limits to physical growth at each age of childhood, and also set a general limit of maturity beyond which there can be no further growth, is evident. Under the best conditions a child will attain a height within a given range each year, and has the capacity for reaching a certain adult height and no greater one. Similarly there must be regular growth in the cerebral

¹² HOLLINGWORTH, HARRY L., *Mental Growth and Decline, a Survey of Developmental Psychology*, chap. iii, pp. 17-23 (Appleton, 1927).

cortex, and an adult structural limit beyond which there is no physical growth.

As structures are thus determined so are corresponding functions. For example, the speed of tapping with the finger increases up to maturity, when constant individual differences are found to exist and further practice brings no improvement. The basis of this improvement must be partly in neural and muscular growth. Intelligence, presumably correlated chiefly with cortical development, passes through growth stages and reaches a limit.

But while hereditary factors are present, environmental factors are necessary for growth. For example, adequate nutrition is necessary for the realization of hereditary potentiality in the matter of height; a certain amount of practice is necessary for the development of tapping ability; and a knowledge of the languages involved is necessary for the attainment of skill in translating, although the effectiveness with which a translation is made may be closely related to complexity of cortical equipment. Growth of structure or development in function may of course be hindered at any stage or stopped entirely, because of environmental factors — diseases, for example.

In mental development, which is functional, environmental factors are in general more numerous and more important than in physical growth. After a person has reached the hereditary limits in the performance of certain rather simple activities, such as tapping, repeating digits from memory, or substituting digits for symbols in a page of the latter according to a key, he may develop indefinitely along other lines according to his experience. To illustrate, after a person has reached physical maturity no amount of practice, we may assume, will increase his ability to discriminate fine differences in pitch, or result in improvement in other

basic musical capacities. But his knowledge and appreciation of music, and his skill in piano-playing, may increase so much as to change him from a dilettante to a master. Social maturity is a matter far more of experience than of heredity, and there are no definite limits to the understanding and appreciation of other human beings which a particular individual may acquire. Mental age, representing the limit of attainment in a number of abilities, does not increase after about fourteen years, but using the abilities he has, and acquiring knowledge and skill in various ways, a person's general ability to deal effectively with the world may increase greatly after the limits of structural growth have been reached.

2. Growth is continuous rather than saltatory. — Although different parts of the body have their peculiar rates of growth, in general both physical features and related mental abilities develop gradually toward a maximum which is reached about the age of sixteen. For physical features this generalization is illustrated by the curve of weight (Fig. 4, p. 79). The growth of the sex organs would seem to be an exception, for there is certainly marked growth in these at puberty. But even here there is not such a sudden change as one might suppose — gradual pre-pubertal growth changes precede the final acceleration.

It has often been assumed by psychologists, notably by G. Stanley Hall, that new mental powers emerge at various periods of childhood, remain strong for a while, and then sometimes die out; and this saltatory theory of mental growth assumes that the emergence of a new mental power corresponds to the "ripening" of neural structures, perhaps the intrinsically determined formation of new neural connections. But wherever we are able to measure the growth of a fundamental mental capacity, we find its beginning

early in childhood, and in general the curves representing performance at various ages rise steadily, though at varying rates, until they tend to flatten out after reaching a maxi-

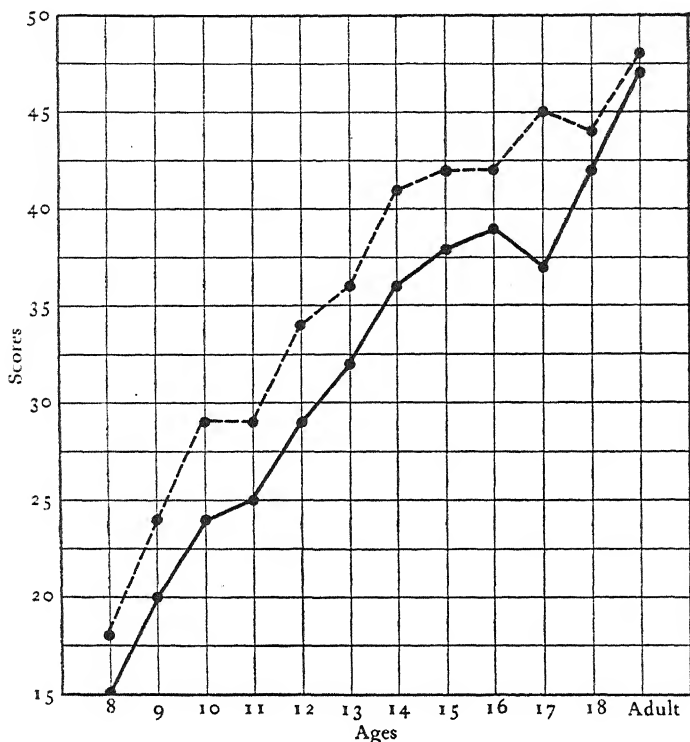


Fig. 6. GROWTH WITH AGE IN ABILITY TO SUBSTITUTE DIGITS FOR SYMBOLS

The curves represent results from over five hundred boys (unbroken line) and over six hundred girls (dotted line). (The data are obtained from Pyle, Wm. H., *The Examination of School Children*, pp. 19 and 38.

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mum at the time of physical maturity. This point is illustrated by the curves in Fig. 6, showing growth in "learning capacity" as measured by performance in a substitution test.

The fact that this curve, after flattening, rises steeply again, may be due to a selection of more intelligent adult subjects, though part of the rise may represent actual growth in average innate capacity after the age of sixteen. Curves showing growth in sensory discrimination, rote memory, reasoning, and other abilities, exhibit the same gradual and steady rise.¹³

For complex abilities which are subject to much environmental influence we may expect less regular development. In general, Hollingworth says, it is when environmental conditions are ordinary or normal that development tends to be gradual. Breaks in continuity are likely to be due to changes in environmental conditions.

3. Development proceeds at the pace at which it starts. — Unless unusual conditions enter in to complicate matters, growth in any measurable feature tends to proceed at a constant rate. In other words, the development of any one feature in a particular child is likely to have a certain constant relationship to the average growth of children in that respect. Baldwin has shown that if a child is much shorter than the average during infancy, he is likely to be shorter than the average at the age of ten, and as an adult.¹⁴ If a child's memory span is larger than the average at five years, it will be proportionately larger during the rest of the period of physical growth.

Curves for mental age, representing average level of attainment in many abilities, show particularly clearly this tendency to maintain the original tempo of development. Figure 7 represents the growth in mental age of bright and average children, by curves based on repeated tests from year

¹³ See BROOKS, FOWLER D., *Psychology of Adolescence*, pp. 59-88 (Houghton Mifflin, 1929).

¹⁴ BALDWIN, BIRD T., and STECHER, LORLE I., *University of Iowa Studies in Child Welfare*, II, No. 1 (1922).

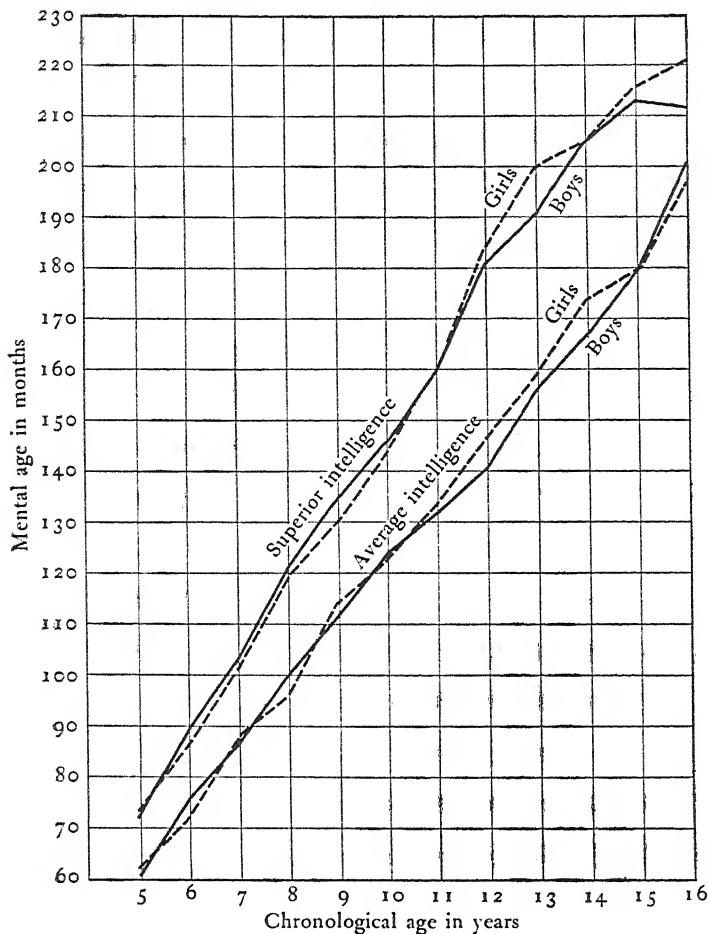


Fig. 7. GROWTH IN MENTAL AGE AS SHOWN IN CONSECUTIVE STANFORD-BINET TESTS OF TWO HUNDRED AND SEVEN AVERAGE AND SUPERIOR CHILDREN

The two upper curves represent children with *I.Q.*'s above 110; the two lower curves children with *I.Q.*'s between 90 and 110. The continuous lines represent boys; the broken lines, girls. (Data from Baldwin and Stecher, "Additional Data from Consecutive Stanford-Binet Tests,"

Jour. Educ. Psychol., 13: 556-560, 1922.)

to year of the same individuals. Such investigations indicate that a child who is very dull in early childhood will not become bright in school or at maturity, unless his dullness was due to remediable conditions; and they show that it is not likely that a naturally bright child, barring unusual conditions, such as disease, will become stupid at maturity.

4. Correlation rather than compensation is the rule. — A popular impression has prevailed that a child who is below average in one line of development is likely to be above average in another. This doctrine may bring comfort to a parent whose child does not do well in school, and provide the parents of a gifted child with an excuse for his failure to achieve in some important respect. But studies of children do not reveal a tendency toward automatic compensation of this sort. On the contrary the natural (or hereditary) tendency seems to be toward correlation, and where one finds compensation it seems to be the result of special environmental influences. It has been shown that in school children the ability of an individual in one subject is not only fairly constant, as compared with the average, from year to year; but those who are good or poor in one subject tend to be good or poor in the others.¹⁵ Gates has summarized the results of correlational studies of a good many traits, physical and mental, in the statement that "on the average, weakness in one trait implies weakness in others: mediocrity in one implies mediocrity in others, and strength in one, strength in others."¹⁶

Hollingsworth's treatment of the tendency toward correlation among desirable traits might lead one to expect more relationship among differing traits than actually exists. Particularly when we compare general anatomical growth with

¹⁵ STARCH, DANIEL C., *Educational Psychology*, chap. iv (Macmillan, 1920).

¹⁶ GATES, ARTHUR I., *Elementary Psychology*, p. 580 (Macmillan, 1925).

the development of intelligence do we find correlations which are so low that in this case to emphasize the fact of correlation might prove misleading. We may consider in some detail the relation between anatomical development and intelligence, a subject in which psychologists as well as parents and others who deal with children have been greatly interested.

RELATION BETWEEN ANATOMICAL AND MENTAL AGE

1. **Carpal Development and Intelligence.** — Severson and Woodrow, in their investigation of one hundred ten-year-old school children in Minneapolis, distinguished among children of this age ten different stages of anatomical development as measured by degree of ossification of the wrist bones. They also had data from tests on the mental ages of these children. The lowest anatomical class had an average mental age of just nine years, and the highest class an average mental age of over ten years and eleven months. "Variation in anatomical age, in children of the same chronological age, thus produced a variation of about two years in mental age."¹⁷ It is not stated whether the same correspondence held for groups between the extremes. For unselected cases Prescott found no correlation between mental age and anatomical index as determined by measurement of the carpal bones, when chronological age was held constant. But in a group of sixty cases in which there was a marked disparity between the level of physical development and chronological age, he found a correlation of $+0.33$, chronological age constant. Thus when there is either unusually slow or unusually rapid anatomical growth, there seems to

¹⁷ Investigation reported in Woodrow, *op. cit.*, pp. 114-115.

be some tendency for intelligence development to follow physical development.¹⁸

2. Dentition and Intelligence. — Bean, in a study made in the public schools of Ann Arbor, found a significant relation between school progress and anatomical age as indicated by the development of the teeth. On the average, children who were below the grade in which were the majority of children of their own chronological age, were also on the average found to be retarded in the matter of dentition; and children above grade were correspondingly advanced.¹⁹ Abernethy found, among one hundred and twenty girls under thirteen, no significant correlation between dentition and Stanford-Binet scores, with chronological age constant.²⁰ Perkins, however, with five hundred and fifty-five pupils aged five to sixteen years, found a correlation of $+.47$ between mental age and number of teeth, chronological age constant. She found no very significant differences in dentition between the merely dull and the normal groups.²¹ The lack of correlation in Abernethy's group may be explained as due to the fact that it was rather highly selected, consisting of pupils in a first-class university school; while the high correlation found by Perkins is related to the circumstance that there were a large number of feeble-minded children among her subjects, and that for this level of intelligence she found definite dental retardation.

At present we do not have sufficient data to justify confident generalization about the relation between time of

¹⁸ PRESCOTT, *op. cit.*, pp. 44-47.

¹⁹ BEAN, R. B., "The Eruption of Teeth as a Physiological Standard for Testing Development," *Ped. Sem.*, 21: 596-615 (1914).

²⁰ ABERNETHY, ETHEL M., "Correlations in Physical and Mental Growth," *Jour. Educ. Psych.*, 16: 458-466; 539-546 (1925).

²¹ PERKINS, F. J., "The Relation of Dentition to Mental Age," *Ped. Sem.* 33: 387-398 (1926).

eruption of the first tooth and intelligence as determined by later tests. Mitchell found no significant relationship between *I.Q.* and appearance of the first tooth in over three hundred children.²² Terman found that among five hundred and fifteen gifted children of *I.Q.* over 140, parents' records showed a variation in age of appearance of the first tooth from three months to twenty-four months, with sixteen cases in which the first tooth appeared after the age of one year.²³

The conclusion suggested by these and other studies on dentition is that there is probably a very low but positive correlation between mental development and dentition. Extreme cases of delayed dentition suggest possible mental retardation, although there is far from a close correspondence.

3. Pubescence and Intelligence. — Studies by Crampton and others indicated that in a group of children of the same chronological age there is a slight tendency for those more advanced in pubescence to rate higher in scholarship and in intelligence.²⁴ But Viteles, in a study of over two hundred normal school students, found no significant relationship between age of pubescence and scores in intelligence tests or in academic achievement. Abernethy, in the study above referred to, found no significant statistical relationship between age of pubescence and mental age. Other investigators present similar data.²⁵

4. Intelligence and Other Measures of Physical Development. — Investigators of the subject generally agree

²² MITCHELL, DAVID, "Physiological Examination of Preschool Age Children," *Ped. Sem.*, 31: 107-147 (1924).

²³ TERMAN, L. M., *Genetic Studies of Genius*, I: 186 (Stanford Univ. Press, 1925).

²⁴ CRAMPTON, C. WARD, "Physiological Age—A Fundamental Principle," *Amer. Phys. Educ. Rev.*, 13: 214-227; 268-283 (1908).

²⁵ VITELES, MORRIS S., "The Influence of Age of Pubescence upon the Physical and Mental Status of Normal School Students," *Jour. Educ. Psychol.*, 20: 360-368 (1929). See also BROOKS, *op. cit.*, pp. 158-160.

in finding a very slight but significant positive correlation between mental ability, however measured, and height and weight; and occasional positive correlations with other measures of physical development. Terman found for five hundred and ninety-four gifted children that the coefficient of correlation between mental age and standing height (with chronological age constant) was $+ .21 \pm .037$. Since this group was highly selected (all *I.Q.*'s over 140), we would expect a much higher correlation in a group typical of the school population in general. While there was a correlation of $+ .16 \pm .03$ with breathing capacity, he found a negligible positive correlation and infrequently a small negative one, with weight, depth of chest and other physical measures.²⁶

Buford Johnson found a similar correlation (chronological age constant) of mental age with strength as measured by a dynamometer, of $+ .13 \pm .08$. She found, however, only an insignificant positive correlation of mental age with height and weight and other measures of anatomical development, and concludes that "there is but slight tendency for the mental age to vary directly with these physical traits."²⁷ It appears, however, that on the average, taking large groups of children into account, the brighter children tend to be slightly superior in general physical development to the duller children. Terman even found that there was a significantly higher percentage of breast-fed children among the "geniuses" than among ordinary children.²⁸

In connection with these data on the correlation between anatomical development and intelligence, it is interesting to note that investigators agree in finding that children of the

²⁶ TERMAN, L. M., *op. cit.*, 1: 169.

²⁷ JOHNSON, BUFORD, *Mental Growth of Children in Relation to the Rate of Growth in Bodily Development* (Dutton, 1925).

²⁸ TERMAN, *op. cit.*, 1: 183.

better social classes not only do better in intelligence tests and advance somewhat faster in school, but also that they average somewhat taller and heavier, and are more advanced anatomically, than children of the lower classes. Now while it is possible that the mental superiority is due almost wholly to hereditary differences in the germplasm, it is also entirely reasonable to suppose that environmental factors, too, are important. The children of the higher classes are certainly on the whole better nourished, and this fact may favor mental growth as it does growth in height and weight.

While the foregoing facts seem to prove the existence of a rough correlation between general bodily growth and the development of intelligence, they also indicate that the relationship is a very general one, with extensive overlapping and a great many individual exceptions. It is clear that knowledge of anatomical development should only be used as supplementary to other data, in estimating the degree of mental development in an individual. In general the most important application of the knowledge of this relationship between general bodily and mental development would be a social one. The importance of adequate nutrition as well as good general environmental conditions is strikingly indicated.

CONCLUSIONS

OF THE general positive conclusions about the relation between physical and mental growth which are important for one who would understand the minds of children, two stand out with especial clearness. In the first place, the attainment of hereditary possibilities of development, both physical and mental, depends upon the existence of a favorable environment. In the second place, it is clear that anyone who wishes to understand the mental development of a par-

ticular child must take into account the stage of anatomical and physiological growth which he has reached, as compared with his companions. There is little relationship between anatomical growth and intelligence test scores, but the stage of physiological development which a child has attained has an important influence on his emotional and social development, on personality traits which cannot be adequately measured by tests. From babyhood through adolescence the growth changes through which the child is passing subject him to ever new stimulation, provide constantly shifting motives. Adults should understand that the whole inner life of a child may be colored as a result of the physical changes through which he is passing—changes which are apt to be reflected not only in the sensory content of the moment, but in derived feelings of shame or power, of inferiority or confidence, which may profoundly influence his future mental development.

CHAPTER IV

THE INSTINCT THEORY AND NATIVE RESPONSES

THE AGE-OLD popular theory that human beings are equipped with a large number of basic inherited ways of acting has until recent years been rather generally held by psychologists. But the traditional views have been profoundly modified as a result of the progress of experimental work. Particularly in view of existing conflicts in theory, it will be important for the student critically to analyze arguments for and against the traditional theory. In making this analysis it must be kept in mind that no absolute separation of the influence of heredity from that of environment is possible. The appearance as well as the development of all inherited traits depends upon the existence of a favorable environment, and this statement must apply to instincts as well as to individual traits. Nevertheless it will be of both practical and theoretical importance to find out what complex ways of acting, if any, we may be sure will appear in all normally developing human beings, in the same way that we may be sure that certain physical traits, such as eyes and ears, will appear.

A Current Conception of Instinct.—First we must be clear about what it is that we are looking for. In the writer's opinion the traditional conception of instinct, essen-

tially as set forth by William James, is still the most clear-cut and serviceable.¹ According to this definition an instinctive response occurs to a *determinate sensory stimulus* — in other words, there are stimuli natively adequate to elicit a particular response, and when the response is evoked by some other than this stimulus, it is no longer a native response. For example, a child's mouth waters the very first time he eats a bit of chocolate bar. This is a native response. Later when he sees a picture of a chocolate bar in a magazine, his mouth may water. This is a learned response. To illustrate by a more complex example of behavior, we may cite the behavior of a puff adder brought by a friend to the room of the writer, in order that she might see the animal execute the death feint characteristic of his species. The snake, when placed on the bare floor or the rag rug and kicked in the "adequate" way, absolutely failed to respond. But when placed in the long grass of the back yard and stimulated in the usual manner, he at once went through the characteristic series of acts — drawing back his head, hissing, and puffing up his throat, and then suddenly turning over and lying motionless. Apparently a particular (determinate) stimulating situation was necessary.

A second implication of the Jamesian definition, namely that instincts conform to the general reflex type and occur without previous education, has been made more explicit by other writers. Herbert Spencer said that "instinct is compound reflex action."² And Watson in 1919 defined instinct, which he at that time thought was a usable term, as "a combination of explicit congenital responses unfolding *serially* (*italics the author's*) under appropriate stimula-

¹ JAMES, WILLIAM, *Principles of Psychology*, Vol. II, Chap. xxiv (Holt, 1923).

² SPENCER, HERBERT, *Principles of Psychology*, Vol. I, p. 432 (Appleton, 1896).

tion.”³ This means that instincts occur in a certain order which is determined by heredity, or in other words that they are organized *pattern* responses. Hence no complex activity in which the order of responses varies from time to time according to the circumstances, or in which certain parts of the total behavior are sometimes present and sometimes not, would be called an instinct. This seems a reasonable position to take, for it is prediction and control we are seeking; and if an activity is indefinite and variable, we shall wish for the sake of effectiveness in dealing with it to analyze it into more definite factors which are susceptible of accurate description.

According to this, which we may call the orthodox conception of instincts, there is no essential difference between reflexes and instincts. There is no such thing as a pure reflex. In even the simplest, as for example the pupillary reflex, many sensory and motor neurones and at least several muscles are involved. Every reflex then is a “combination of reflexes,” and when the combination consists of serial instead of simultaneous responses it only means that certain of the responses provide the native stimuli for the next reflex response — the whole act is made up of reflexes. There is no point at which a sharp line can be drawn between reflex and instinct, but in general the more complex combinations of reflexes are called instincts. According to our definition, however, the combination itself must be determined by heredity, which means that each act or reflex in the pattern occurs in a particular order and in response to a definite stimulus.

Emotional Responses May be Instinctive. — In this chapter we are concerned not merely with the useful-

³ WATSON, J. B., *Psychology from the Standpoint of a Behaviorist*, pp. 231-232 (Lippincott, 1919).

ness of the instinct theory, but with the determination of native responses in general, whether reflex or instinctive, simple or complex in type. We are, moreover, interested not only in explicit or overt responses (to use Watson's term) but also in internal responses such as dilatation of the walls of blood vessels (accompanied by flushing of the cheeks), increase in certain glandular secretions, contraction or inhibition of activity in internal muscles, and any groupings or combinations of such reflexes which are native. When a person responds to a stimulating situation by a general bodily reaction in which visceral or glandular components predominate, psychologists say that the response is an emotional one, and the internal reflexes may be called emotional reflexes. The term *emotion* is used by adherents of the James-Lange theory to refer to that complex of bodily sensations which accompanies the internal responses. Other psychologists apply the term emotion to the "total stirred up condition of the organism" (Woodworth) and make the term include all responses that occur at the time, whether accompanied by sensations or not. According to this definition emotion would include also certain overt components of the total response, such as clenching the fists or curling up the nostrils.

Whichever definition is held, it is recognized that internal reflex responses are fundamental in emotion, and that they can be aroused by external as well as internal stimuli. We know that they can, moreover, be conditioned in experience. For example, a sudden loud sound is an adequate stimulus for the group of starting, trembling, and general internal responses which we call fear responses or fear. Now these fear responses may through individual experience come to be aroused by stimuli which formerly had no effect. For example, a person who has seen revolvers fired off may start

violently when he sees one cocked, before the sound actually occurs. Emotional responses in movies are made to such "inadequate" or substitute stimuli. For our purposes it is sufficient to recognize that there seem to be certain emotional responses, or groups of responses, which are elicited without learning by specific stimuli, and it is important for us to find out if possible what reactions in human beings are of this character. Since it is within the years of childhood that, according to James and others, instincts gradually appear and can be taken advantage of for purposes of training, the problem of determining what are the instincts or truly native responses in human beings is of particular importance for child psychology. We may therefore consider rather carefully the chief criteria which have been considered useful in identifying native responses.⁴

CRITERIA OF NATIVE RESPONSES

I. **Definite Correlation with Inherited Physical Structure.** — In a given species of animal, certain responses are obviously related to definite structures. Peculiar ways of taking food, movements of legs and wings, and manner of clasping objects vary according to the structure of the animals, and are manifested when the necessary structure appears. When the tadpole becomes a frog, its behavior changes accordingly. In human beings definite growth changes are reflected in behavior. The "change of voice" at puberty, for instance, is known to be correlated with enlargement of the vocal cords. Babies at first remain lying down when not held. Soon they lift

⁴ For an unusually detailed discussion of such criteria, along with a criticism of theories of instinct see CARR, HARVEY A., *Psychology*, chap. xvi (Longmans, 1925). Some of the points made in the following discussion are adapted from this chapter.

up their heads and look around, later they sit up, then they are observed to stiffen their legs so that they stand when raised up. These changes seem to be dependent on muscular growth. There are also definite changes in the character of vocalizations, some of which are apparently clearly related to the appearance of specific structures. So early does learning take place, however, that it is difficult in many cases to be sure whether it is physical growth that accounts for a new reaction. In human beings the number of acts certainly dependent on definite structures is small.

2. Wide Distribution in the Animal Kingdom. —

The very fact that specific ways of acting may be obviously correlated with special structures indicates that this criterion is doubtful. Controlled experiments indicate that in certain animals quite complex groups of coördinated reflexes do occur without learning. A young tern, observed from birth by Watson, caught fish successfully at the very first attempt, by hovering over the water, taking aim, and seizing a fish at just the moment it had leaped out of the water.⁵ Dogs and other animals go through the complex movements of swimming, without practice. Moths lay their eggs in complex ways without previous experience. But these instances demonstrate only the *possibility* that activities as complex may be inherited in human beings. Babies have a far more limited equipment at birth than these animals, and perhaps learning plays a correspondingly more important rôle in their development. In order to determine what responses are native in human beings, we must study human beings themselves. The test of wide distribution is there-

⁵ WATSON, JOHN B., "The Behavior of Noddy and Sooty Terns," *Carnegie Publications* No. 103, *Papers from the Marine Biological Laboratory at Tortugas*, 1 and 2 (1908).

fore no more than suggestive: we cannot argue from one species to another.

3. Stereotyped and Unconscious Performance. —

It is known that any well fixated habit of long standing may be performed automatically and quite without foresight of the end, and may have all the appearance of being an "instinct." Yet psychologists as well as laymen have been misled into calling certain ways of acting instinctive simply because of their unconscious origin and automatic character. By the earlier writers many social habits were thus erroneously called instincts, such as civilized man's habit of sleeping with his head toward a wall, called an instinct by James. Popular confusion on this point is reflected in such expressions as "He instinctively lifted his hat." A striking experimental example of what often proves to be a genuine difficulty in distinguishing between widespread social habits and instinct, is the well-known behavior of Scott's orioles. When reared entirely separated from others of their species, the young birds developed a song of an entirely new pattern, so different from the one characteristic of the species that several trained ornithologists, hearing the birds sing without seeing them, were unable to identify it.⁶

4. Universality. — Although this criterion has been very generally applied as a test by psychologists, it has proved little more satisfactory than the criterion last named. Many ways of acting which are almost universally present in a given social group or even in the whole human race, can best be explained as acquired habits. The use of an organized language is an example. Each individual acquires anew the language of his group. Almost all human beings are observed to have some fear of the dark, and in the first period of scientific psychology fear of the dark was consid-

⁶ SCOTT, W. E. D., "The Inheritance of Song," *Science*, 19: 154ff. (1904).

ered a genuine human instinct. Recent researches, however, as well as successful attempts at control through prevention, have quite definitely shown, as will shortly be explained, that this fear is developed as a result of experience. Its general prevalence is adequately explained by the consideration that human beings everywhere are likely to be subjected to common experiences — for example, thunderstorms, stumbling or falling in the dark, and the like — through which they acquire this fear.

Conversely, the assumption is unjustified that if a given type of reaction appears in only a small percentage of human beings, it cannot be native. An animal is said to possess a certain native mode of behavior when its inherited neuromuscular organization is such that a given stimulating situation will be followed by that particular reaction. Now such inherited organization may be present but fail to be manifested in overt activity for lack of stimuli, or because the individual has early learned to substitute some other response for the native one, or finally because only the internal responses appear while the overt responses are inhibited.

Absence of stimuli may largely account for the general absence of kicking and biting responses in civilized groups. The case of apparent failure to appear because of habitual substitution of response may perhaps be illustrated in the supposedly instinctive "submissiveness" of negroes and of women, even sometimes in the face of direct physical cruelty. Such behavior may be explained as the result of social influence or training which has persisted for generations, and affects the individuals in question at such an early age that the aggressiveness of which they are capable is never developed.

5. **Appearance at Birth.** — This is of course a reliable criterion of *native* responses, by the definition of the latter.

It may be said that what we really wish to determine, however, are the truly hereditary traits of the species, and that some native responses may be congenitally determined. This is probably true. There is good reason for supposing that some learning takes place before birth. The child is certainly moving and responding to stimuli for many weeks before that event. The possible significance of this intra-uterine activity in serving to define and condition various responses has been pointed out by H. L. Hollingworth in an article called "How We Learn Our Reflexes."⁷ Watson has suggested that right- or left-handedness may in some cases have been acquired as a response to intra-uterine positional stimuli.

The possibility or probability that there is genuine prenatal learning constitutes an important theoretical problem, and again calls attention to the interdependence of "heredity" and "environment." For purposes of practical convenience in dealing with the material, however, it seems best to attempt no more than the isolation of *native* responses, which may be called instinctive, inasmuch as one can predict that they will appear in all normal human beings. It seems likely, considering that the uterine environment as well as the range of possible activity is very definitely limited, that such prenatal learning as does occur takes place in all normal infants, because of the uniformity of the special environmental conditions. The criterion of appearance at birth, then, would still be a valid one.

6. Appearance Some Time after Birth without Opportunity to Learn. — This test appears to be conclusive. A series of responses performed in a fixed order for the first time by an animal which has had no opportunity for ac-

⁷ HOLLINGWORTH, H. L., "How We Learn Our Reflexes," *Psych. Review*, 35: 439-442 (1928).

quiring it must be inherited. But the criterion is very difficult to apply. Often it is assumed that there has been no learning when the matter has not been adequately tested. There are several reasons why ordinary observation is not sufficient. The statement of a person that he has always felt or acted thus and so is, of course, unreliable. Children and adults may perform automatically certain acts which were acquired when they were infants, and if they ever were conscious of a time when they lacked the ability, they have now forgotten it. Again, experiments in learning demonstrate that some reactions may be and often are acquired by the human adult without awareness of the process.⁸

Nor will casual observation of children by others, however intelligent, yield accurate data, although this method has been rather largely relied upon. James, in the *Principles*, tells of a fear of a pug dog which developed suddenly in his little girl at the age of eight months. "It is needless to say," James writes, "that no change in the pug's unfailing friendly conduct had anything to do with this change of feeling in the child." But the experimental psychologist of to-day would not be satisfied with such an opinion. He would insist that the only way to get reliable evidence on the point of first appearance of responses in children is to study children themselves, not in the ordinary casual way, but by means of carefully controlled observation *from the time of birth to the time of the first appearance* of a given response. It was the physiologist Preyer who, long before experimental animal psychology was born, pointed out the necessity for such accurate genetic study. "The instinctive movements of human beings are not numerous," he wrote, "and are difficult to recognize (with the exception of the sexual ones) when once the earliest youth is past. So much

⁸ See the chapter on "Perceptual-Motor Learning: Complex Habits."

the more attentively must the instinctive movements of the newly born and of the infant and of the little child be observed. In order to understand them, accurate observation of the instinctive movements of newborn animals is necessary.”⁹

Of the six leading criteria which we have considered, it appears that only three are reliable, namely correlation with inherited physical structure, appearance at birth, and appearance at some time after birth in the absence of opportunity to learn. These three tests will not, however, serve as sure means of determining what are the native responses common to the human species. In the first place, we have seen that no one of them can in all cases be applied without chances of misinterpretation. Especially in the case of the last named criterion is it sometimes impossible, even with painstaking experimental control, to separate learned from unlearned factors. In the second place, while we can often by their application establish the native character of given responses, the criteria will not enable us to say of other responses which do not meet them that these are *not* native. There may be, for all we know, responses or complex groups of responses other than the sex responses which appear some time after birth and are native, which yet do not meet any of our criteria. Still it is clear that by applying these tests in connection with careful observational and experimental work, we can make a good beginning at listing native responses.

Biographical Studies. — We may describe briefly the results of certain leading types of work on the problem in hand. Preyer himself made important observations of animals from the time of birth, but his most important contribution, reported in the *The Mind of the Child*, is the record

⁹ PREYER, W., *The Senses and the Will*, p. 235 (Engl. trans., Appleton, 1890).

of the development of his son, whom he observed at least three times a day (morning, noon, and evening) for three years, with only two exceptions. The book contains a wealth of accurate information about the first reflexes observed in this child. He lists as innate responses crying, sneezing, yawning, eye movements, various defence movements, starting and crying at a sound, and responses to temperature, touch, sound, organic and other stimuli. Instinctive movements Preyer regards as inherited responses, non-voluntary but lasting for some time, and conscious. He reports in detail the development of seizing in his boy, concluding that only the clasping and holding (involving reflexes) are instinctive. The child requires many weeks before he learns to reach out and grasp objects looked at. Coördinated sucking appeared immediately after birth. Preyer observed later such responses as licking, biting, and chewing.

He gives detailed descriptions of the way in which his boy gradually "learned" to sit, stand, creep, walk, and climb, but concludes that "these movements are predominantly or exclusively instinctive. They are not imparted by education." Since their development is gradual, and since specific practice was observed to play some part, we cannot, of course, conclude without further evidence that all these responses are hereditary. Experiments have shown the necessity for more isolation and control of factors than was possible for Preyer. In general one is struck by the meagerness of the list of responses which on the basis of factual study he is willing to make.

Other biographical studies, before and after Preyer's, give few additional facts about inherited responses in children. Such careful observations as those of Darwin, Shinn,¹⁰ and

¹⁰ DARWIN, CHARLES ROBERT, "A Biographical Sketch of an Infant," *Mind*,

others, furnish corroborative data, but in no case is clear evidence given for the appearance without opportunity to learn of more complex pattern responses than those which Preyer names. The same may be said of reports in other diaries such as those of Mrs. Moore and the Scupins.¹¹ In all these biographical studies only those responses noted as appearing for the first time or very early are significant for our purposes, since as soon as a child begins to move about and to talk, the environment and the experience become so complex that ordinary non-continuous observation is not sufficient to determine even roughly whether or to what extent a given act is learned or inherited.

Experimental Studies. — The method of systematic and controlled observation from the time of birth, advocated with so much insight by Preyer in 1880, was not actually applied to any significant number of children until a generation later. In 1917, under the direction of John B. Watson, an extensive psychological study of infants under laboratory conditions was being carried out in the maternity ward of the Johns Hopkins Hospital. The first report of this work was published by Mrs. Margaret Gray Blanton.¹²

In this preliminary observational study a large number of infants were studied during their first month of life. The report does not make clear for just how long after birth each infant was under continuous observation, but in individual cases the time elapsing before a reflex first occurred is given in hours or minutes. Responses which were made within the first few weeks in all or nearly all of the infants,

2: 285-294 (1877); SHINN, MILICENT WASHBURN, *The Biography of a Baby*, (Houghton Mifflin, 1900).

¹¹ MOORE, K. C., "The Mental Development of a Child," *Psychol. Rev. Mon. Suppl.*, No. 3 (1896); SCUPIN, E. and G., *Bubi's erste Kindheit* (Leipzig, Grieben, 1907).

¹² "The Behavior of the Human Infant during the First Thirty Days of Life," *Psychol. Rev.*, 24: 458-483 (1917).

without opportunity for special acquisition, may provisionally be considered unlearned. Yet it is true, as we shall make clear a little later in this chapter, that special research is necessary in order to isolate unlearned factors in any reflex activity, even the simplest, which develops at an interval after delivery.

Mrs. Blanton's work has been fully described and summarized in a number of books and articles.¹³ It is an impressive objective account of the wealth of reflex activity exhibited by the newly-born infant. Practically all of the activities listed had been reported before as occurring in young babies, but in scattered articles and "biographies" of individuals. This was the first comprehensive account based on controlled objective observation of a large number of children. Peterson and Rainey had indeed as early as 1910 published the results of extensive and careful experimental observation of over a thousand newborn infants; but their point of view was subjectivistic, and their chief aim was, by establishing the fact of differential responses to various sensory stimuli, merely to attempt to show what probable sensations the newly-born have.¹⁴ The present study is broader in that it takes account not only of the stimuli (leaving us to infer sensations if we will), but also and especially of the responses representing the beginnings of effective adaptive behavior of various kinds.

Besides the usual "simple" reflexes and complex reflex groupings such as yawning, sneezing, and sucking, a number of observations are reported which point to conclusions about certain fundamental activities. Complex defensive

¹³ See especially, besides the above, WATSON, J. B., *Psychology from the Standpoint of a Behaviorist* (Lippincott, 1919); also the same author's *Behaviorism* (Peoples Institute, 1924).

¹⁴ PETERSON, F., and RAINEY, L. H., "The Beginnings of Mind in the New Born," *Bulletin of Lying-in-Hospital* (New York, December, 1910).

activities were observed. "To deep pricking of the big toe given in the course of medical treatment, two babies each responded by crying and a pushing movement of the other foot. To a prick on the wrist three out of twenty-one infants responded on the second day." The fact that specific sex responses may appear very early is shown in the observation that in four babies erection of the penis occurred at birth. Very complex unlearned fear responses occurred when three newborn babies were accidentally lowered with unusual suddenness.

The next report of the experimentation at Johns Hopkins was made by Dr. and Mrs. J. B. Watson and presented the results of experiments conducted in the psychological laboratory in 1919 and 1920. The aim of these experiments was to observe not only the first appearance of certain responses, but also the early development and modification through experience of certain native reflexes. The authors called attention to the fact that "At present we simply have not the data for the enumeration of man's original tendencies and it will be impossible to obtain such data until we have followed through the development of the activity of many infants from birth to advanced childhood. Children of five years of age, and over, are enormously sophisticated. The home environment and outside companions have so shaped them that the original tendencies cannot be observed."

In answer to the criticism that this experimental study must have been harmful to the infants the authors say, "The human infant in general is sturdy, and well able to stand all the simple tests we need to apply. . . Probably none of our tests is any more strenuous for him than giving him his morning bath or changing his clothes. We have worked . . . so far without the slightest temporary or permanent mishap. . . The work is done under the competent super-

vision of physicians and we take the stand that what we are doing will be important in the long run in lessening human misery and maladjustment."

During the course of the investigation the authors worked in different ways with over five hundred infants. All of these were tested in the laboratory, a large number both when newly-born and later at intervals. Others were given special experiments and tests at times demanded by the nature of the problem. There was not, then, absolutely continuous observation of individual infants, but the method was that of controlled experiments on infants whose general psychological history was known, since they had spent their "brief preceding lives" in the Hospital attached to the University.

The results of this now famous investigation have been presented by J. B. Watson in a stimulating way in numerous articles and books.¹⁵ The investigators secured quantitative data on the grasping reflex, which since Darwin's time had interested biologists as evidence of simian ancestry; they worked out several suggestive but not conclusive tests for handedness; they studied the nature and development of reflex eye movements; and they made observations on the Babinski reflex, or flexion response of the big toe to stimulation of the sole of the foot. The Watsons also made observations on other more complex responses such as sitting alone, "progression," defense movements, grasping, and standing, all of which they seem to believe are instinctive, and develop with increase in muscular strength.

Undoubtedly the most significant part of the investigation

¹⁵ Students should study carefully at least one of these: WATSON, J. B., and WATSON, R. R., "Studies in Infant Psychology," *Sci. Monthly*, 13: 493-515 (1912); WATSON, J. B., *Psychology from the Standpoint of a Behaviorist* referred to above; also the same author's *Psychological Care of Infant and Child* (Norton, 1928).

was concerned with emotional responses. Although these experiments have been described so often that it might seem unnecessary to do more than mention them, they are so central in present-day psychological discussions that we shall present briefly at this point the methods used and the conclusions reached. The authors in their report state that they discovered "three fundamental inherited emotional patterns." These they describe as follows, stating for each the native adequate stimuli, and showing how the evidence was obtained.

(1) Fear responses consist of "a sudden catching of the breath, clutching randomly with the hands, the sudden closing of the eyes, and the puckering of the lips followed in some cases by crying." They occurred in response to only two stimulating situations. The first was removal of support. The infant tested was held just above a pillow and allowed to drop suddenly, the blanket upon which it was lying was suddenly pulled, or the infant was given a sudden shake or push. The second adequate stimulus for the fear response was a loud sound, the striking of a steel bar with a hammer being one of the experimental ways of producing this stimulus. (2) Rage responses consist of a stiffening of the body with slashing movements of the hands and arms, accompanied by crying and then holding of the breath. They were elicited by only one type of stimulating situation, that is "hampering of the infant's movements." (3) Love responses, observed only incidentally, involve cessation of crying, smiling, and in older children gurgling, cooing, and finally extension of the arms. These responses were called out by the stimulation of what Watson says may be called the erogenous zones, in rocking, patting, and the like. The authors make no distinction between the stimulation of the sex organs and the stimulation of other sensitive areas such

as the lips and the cheeks. Their use of the term love has consequently much in common with the Freudian use of the term sex. Indeed they state that the term embraces all affectionate responses as well as the responses seen in adults between the sexes and that these responses "all have a common origin."

Other stimuli, such as those from furry animals and the dark, have long been considered "native stimuli" for fear responses. To put the matter to experimental test, the authors worked with a special group of six or seven children aged four months to one year. It seems that none of these babies, who were children of wet nurses in the Hospital, could have developed conditioned fear responses, since "they had never seen an animal or any of the objects which were later presented to them in the laboratory."

Two series of tests were given. In the first the children were seated in the laboratory, usually in the lap of the mother or a nurse. Live animals were presented separately in various ways — a cat, a pigeon, a rabbit, a white rat, and a dog. The latter was first presented in a room which was nearly dark. The reactions of all the children were positive — they reached for the animals and tried to play with them. Each child was then taken to the dark room and a bonfire was built in front of him. No fear responses occurred. The second part of the testing consisted in taking each child to the zoölogical garden and confronting it with many different animals. Here too the responses were positive.

The authors summarize the results and draw conclusions as follows. "Never in any experiment on any child was the slightest fear response obtained. Almost the invariable mode of behavior was reaching for the object, followed by handling or manipulation. Our results seem to show conclusively that when children are brought up in an extremely

sheltered environment, such as never is afforded by the home, fears are not present to other stimuli than those which we have enumerated."

This study of the Watsons is incomplete and needs supplementing, as the authors themselves say. J. B. Watson himself cannot, as we have seen, even be given the credit for suggesting this important method of study. Yet it is greatly to his credit that although others, not only Preyer but also Hall, talked of the need of experimentation, Watson was the first actually to undertake it on a large scale. Then, too, his interpretation of the results is stimulating in its suggestions about the control of human nature and fertile in ideas for new research, so that the study, in the opinion of the writer, deserves its reputation for being an epoch making piece of pioneer research.

Observations made by others lend general support to Watson's conclusions about the fearlessness of infants. The Sterns report that their children showed no fear when in the dark or confronted by animals.¹⁶ The Scupins report that their son showed no fear of animals, or even of his first thunderstorm.¹⁷ The author's little daughter when tested at the age of nine months and again at thirteen months showed no fear of any animal presented, no fear of the dark nor of high places. A little girl of five observed by the author showed great interest and pleasure on finding a tangle of worms under a wet board in the garden, and solicitously transferred them in her hands to a "nicer place" by the front porch.

On the other hand, careful observations made by psychologists indicate that the Watsonian list of native fears is probably too limited. In reports on individual infants we

¹⁶ STERN, WILLIAM, *Psychology of Early Childhood*, pp. 488-494 (Holt, 1924).

¹⁷ SCUPIN, E. and G., *op. cit.*, p. 58.

find scattered records of fear responses to the visual stimuli involved in sudden movement. It may be argued that sudden movement often occurs along with a noise or mechanical jarring (causing slight "loss of support") so that these responses are really conditioned, but this explanation seems a little far-fetched. The author's daughter at the age of five months showed sudden fear, with violent starting, when her mother got up very suddenly from her chair and approached the crib from the side and top, so that the baby saw her with peripheral vision. There was no noticeable sound at the time. Others report similar incidents.

Then too there seems to be some evidence for the essential correctness of James's statement that fear of strange men and strange animals is instinctive. Babies who react contentedly to any member of the family group are notoriously "inhibited" or timid in the presence of strangers. A baby may be timid to most strangers but natural and responsive to others who "have a way with babies," that is, who because of their experience behave toward them in the accustomed ways. This difference is illustrated in the behavior of the writer's little girl on two different occasions. When she was thirteen months old she saw a colored man for the first time. He was unusually tall and large, his face and hands were quite black, and his voice was deeper than any to which she was accustomed. He reached out his hand to the baby and spoke in a friendly way, and she at once responded smilingly, playing with him without a sign of timidity, though with most strangers she was a little timid or at least reserved. When this little girl was twenty-one months old, an old friend of her father's came to visit the family. Before she was up next morning he had established himself in her father's easy chair, and was reading a magazine. The baby ran in for her usual greeting to her father, but she stopped

short just inside the door. Her lower lip went down, and whimpering began, which soon changed to loud crying, although the guest greeted her quietly and in a natural and friendly way.

An explanation might be that in this case, since the child is prepared emotionally and overtly for one type of stimulating situation, when the very different one is suddenly encountered there is a conflict of impulses and the habitual overt modes of response are blocked. Allport suggests that "suddenness of the stimulus, or lack of proper somatic adjustment, often causes the impulse to be discharged through the sympathetic efferents," that is, results in internal emotional responses.¹⁸ We should thus expect timidity or fear to be aroused in a child by any type of object or situation toward which it has no "developed habits of response" which have been gradually acquired. If Allport's explanation of fear is correct, and to the writer it seems more reasonable though less simple than Watson's, it is not the modality of the stimulus (whether auditory, tactual, etc.) which primarily determines the fear response, but the manner of its application.

Allport considers that it is not only suddenness of the stimulus which results in emotional response, but intensity, repetition, or "insistence," and any blocking of the somatic responses to powerful drives.¹⁸ Without any opportunity to learn the child may respond with emotion to stimulation marked by any of these features. The emotion is called fear or anger or something else, not on the basis of a particular stimulus involved or a particular set of internal responses, but on the basis of the type of overt adjustment which is made—whether for instance it is shrinking, struggling, or attacking.

¹⁸ ALLPORT, FLOYD H., *Social Psychology*, pp. 91-94 (Houghton Mifflin, 1924).

It is clear that we need much more research before we can formulate a satisfactory explanation of emotional responses in children, or draw up a reliable list of the purely native responses of this type. Stimulating and practically helpful as Watson's investigations have proved, his theory of emotions seems weak, especially on two counts.

In the first place, we may disagree with his conclusion that there are "three fundamental inherited emotional patterns." There is no evidence in the original report that there occurred any clearly definable set of responses to any of the stimulating situations presented. Instead the overt responses were many, varied, and overlapping. Experiments on adults show that in what we commonly call anger we have many of the same internal responses that occur in fear, and that some of the overt responses are also the same; some of the behavior components of surprise, again, are like those of fear or anger, and so on.¹⁹ Experimental studies of facial expression in infants during emotion have so far failed to reveal clearly marked definitive expressive movements for the various emotions. In a study of emotional expressions in infants as judged from moving pictures by medical students and students of psychology, the Shermans found wide disagreement as to the character of the emotion exhibited. The naming of the emotions was greatly altered when the subjects were told with each picture the nature of the stimulus.²⁰

Thus it seems that Watson's tentative listing of three emo-

¹⁹ LANDIS, CARNEY, "General Behavior and Facial Expression," *Jour. Comp. Psychol.*, 4: 447-509 (1924); FELEKY, A. M., "The Expression of Emotions," *Psychol. Rev.*, 21: 33-41 (1914); LANGFELD, H. S., "The Judgment of Emotions from Facial Expressions," *Jour. of Abnormal Psychol.*, 13: 172-184 (1918-1919); RUCKMICK, L. A., "A Preliminary Study of Emotions," *Psychol. Rev. Monographs*, 30: 30-35 (1921).

²⁰ SHERMAN, M. and I. C., "The Differentiation of Emotional Responses in Infants, I—Judgments of Responses from Motion Picture Views and from Actual Observation," *Jour. Comp. Psychol.*, 7: 265-284 (1927).

tions as primary on the basis of the type of response involved is not the most useful procedure. Fear, anger, and love appear rather to be useful as rough classifications of all the emotions, not as names of particular emotions, and we may have to use other main heads to include all the significant components of native emotional responses. There seem to be a vast number of possible internal responses, and which will be called out depends primarily on the pattern of the stimulating situation, not upon the existence of any fundamental organized groups of responses which may be distinguished as special primary emotions. To illustrate, the fear responses occurring when we are able to run are different from those occurring when escape is impossible (Carr), and the fear aroused by loss of balance when in ocean water is different from the fear aroused during a thunderstorm. Carr concludes that "it is the behavior-situation that constitutes the primary and distinctive characteristic of an emotion . . . and one emotion is just as primary . . . as another."²¹

A second weakness of the Watsonian interpretation, in the writer's view, is the classification of responses to stimulation of the cheeks, chin, and other sensitive areas as sex responses. It seems to the author more reasonable to consider as sex responses only *those which arise from stimulation of the sex organs, or responses in the sex organs themselves*. Following Allport we might classify separately all positive responses to stimulation of other sensitive areas, and call them "sensitive zone reactions." The young child then would be said to exhibit very few sex responses, but some pleasurably toned sensitive zone responses, and these would form the chief native basis for love toward parents and others who care for the child. Only with the approach of

²¹ CARR, *op. cit.*, p. 281.

puberty, according to Allport, would we find many and complex sex responses, and only then could the love of a child for parents include important sexual components. At the same time the emotional sex responses would become conditioned to sensitive zone stimuli, so that now the stimulation of sensitive zones would call out definitely sexual emotions.²²

This theory, although it too has its limitations, seems to square with the facts we have better than the Watsonian interpretation does. Allport's theory is perhaps misleading if and in so far as it implies that genuine sex responses of an emotional character do not appear until the approach of puberty. The prevalence of masturbation in young children, and the reports of adults that childhood masturbatory practices were accompanied by specifically sexual emotion, indicate that stimulation of the outer sex organs themselves as well as internal sex stimulation may result in intensely exciting sex emotion long before the special growth changes of puberty begin. Both the time at which this sex emotion becomes possible and the extent and intensity of its manifestation doubtless vary greatly from individual to individual; and also in relation to such factors as health, exercise, and opportunity for other types of emotional expression. Yet it is important to remember that in some normal children these native responses, usually thought of as connected with the adolescent changes, may be present very early.

It is Allport's contention that the only native stimuli for sex responses are either contact applied to sex organs, or internal stimuli, the latter connected with physiological processes; and that it is through conditioning or learning that these responses come to be evoked by the mere sight of members of the opposite sex. This view is reasonable and

²² ALLPORT, *op. cit.*, pp. 67-69.

seems to be in accordance with clinical findings. Certainly we have no positive evidence that sex responses to the *sight* of members of the opposite sex are native.

Since the work at Johns Hopkins there has been great interest in the experimental study of infant behavior. More and more it has come to be realized that it is not an easy matter to determine the time of first appearance and to isolate native factors, and that to accomplish these ends there must be special intensive study of the development of particular reflex activities. One example of such an intensive study is that of Mandel and I. C. Sherman, who investigated five groups of reflexes, the plantar and pupillary reflexes, responses to sticking with a needle, eye coördination, and defense movements of the arms.²³ These they studied in ninety-six infants varying in age from one hour to twelve days. "All the responses . . . were found to be imperfect at birth, and showed an increase in adequacy with advance in age, up to a certain point, at which the responses were perfected." We may describe for illustration the methods and results in the case of defense movements of the arms which were elicited by pressure on the chin with the examiner's forefinger. A coördinated movement was considered to be one in which both of the infant's hands touched the examiner's finger at the chin in a pushing motion. Results of trials up to thirty in number but not beyond are reported. Defense reactions of the hands, *not coördinated*, were observed in the youngest infants. "As the infant increased in age the defensive movements became less indefinite and irregular, and the pushing away of the examiner's finger a more coördinated response, up to the age of about one hundred and eight hours, when

²³ SHERMAN, MANDEL and IRENE C., "Sensory-motor Responses in Infants," *Jour. Comp. Psychol.*, 5: 53 ff. (1925).

the reaction was made fairly regularly and accurately with both hands, the infant in many cases using one hand with good precision. . . . No subjects made a perfectly coördinated reaction in less than four trials."

To what extent such rapid and early development is a function of physical growth and increase in strength, and to what extent it may depend upon genuine learning, is not in all cases made clear by these experiments. The study illustrates the great difficulty of distinguishing between learned and unlearned factors, suggests that learning may occur even within the first three days, and indicates the need for continuous and carefully controlled observation. The authors suggest the importance of such quantitative genetic study of a large number of cases in order to arrive at an age scale for various reflex and instinctive activities. They believe that such data would be valuable for the accurate determination of degrees of abnormality or retardation in the development of individual cases.

Much of the work on infants and young children has been concerned with the determination of comparative standards of development of gross motor activities, adaptive behavior, speech and social responses. The most common aim has been to secure reliable tests of intelligence, tests which shall enable prediction of future mental status at an early stage; but incidentally some light has been thrown on the problem of native differences in sex and race, the possible origin of emotionality and other interesting questions. With some of these we shall deal later. As yet none of this work, in which Professor Gesell of Yale has been especially prominent, seems to have resulted in isolating any important instinctive responses other than those already mentioned.

CONCLUSIONS FROM FACTUAL STUDIES

WE MAY conclude that all the responses to particular stimuli, which under controlled conditions have been observed to occur at birth or after birth in the absence of opportunity to learn, are native. To these we must add sex responses, both overt and implicit, which are known to occur coincidentally with pubertal development. Our criterion for the native character of these responses is, of course, correlation with inherited physical structure.

In summarizing our evidence we must again remind ourselves that no "inventory of native responses" should be looked upon as a complete list. It is possible theoretically that other than native sex responses occur after early childhood, and are dependent upon the maturation of physical mechanisms at present unknown. On the other hand, if the new activities which do appear as the child grows up can be more adequately explained as due to perceptual-motor or ideational learning, as the next chapters will attempt to show, then the more reasonable working hypothesis is that they are probably acquired.

The experiments on native responses which have already been made constitute, of course, only a beginning. They have furnished a body of reliable data and have especially shown the great value of the method of continuous observation. But many more experiments are needed. There is a chance for even more valuable contributions from psychologically trained parents than have heretofore been possible, for they can now use more or less standardized methods. There are great possibilities in the use of phonographs and moving pictures in recording results. The coöperation of general biologists, physiologists, and neurologists is needed, and is indeed already secured. Studies of individual, racial

and general group differences now in progress may in the future throw much light on original human nature.

At present the conclusions from controlled observational and experimental studies may be stated as follows:

1. A very large number of simple responses occur at birth or shortly after, without any opportunity for learning, and these are undoubtedly native. These include adaptive responses of the sense organs, such as the pupillary and other eye reflexes; withdrawing responses to pain stimuli; rejecting movements of the tongue, hands, etc., as when a satiated baby refuses the nipple; reaching, initiated by visual stimuli; smiling on being stroked or patted on certain areas; responses of the sex organs to internal stimulation; general bodily response to the organic stimuli involved in hunger; and vocalizations of various kinds. These responses are of the type commonly called simple or compound reflexes, although of course many, sometimes hundreds of reflexes, are involved in the same response. Responses of this sort are often astonishingly accurate and effective, yet in the human infant they are no more complex than the responses which have been demonstrated to occur in a decerebrate frog or dog.

2. Some more complex responses of a serial character appear under the same kind of conditions as the above, and are just as unquestionably native. They include sucking, tongue movements and swallowing when the nipple comes in contact with the lips, digestion and elimination, and holding an object placed in the hand (after a few weeks from birth). These represent the few complex acts involving *serial* coördination which are definitely known to occur without learning. It is significant that the successive stimuli involved in the performance of the acts are internal, though they are all originally initiated by ex-

ternal stimuli. These activities would comply with the ordinary conception of an instinct as a combination of reflexes occurring on appropriate stimulation and in a particular order determined by heredity.

3. Many patterns of response which occur in all infants sooner or later are of doubtful genesis, experiment and controlled observation so far not having succeeded in isolating the native factors. A limited number of such complex acts not involving responses to moving objects and persons, and performed in a stable and homogeneous environment, may be definite instincts. The clearest examples in human beings are sitting, creeping, and walking; and since these develop gradually they may be partly dependent upon learning. Other complex responses appear partly to be based upon physical growth, possibly with the formation of new neural connections, and partly upon the acquisition of new habits of response. They include such activities as reaching, babbling, and climbing. Many experiments besides those of the Shermans show that learning may occur very early in infancy, and that it is exceedingly difficult to study the separate influence of learning and physical maturation.

4. There is no conclusive evidence that in children such complex responses as playing with dolls, imitation, fighting, gregariousness, love of parents, and the like are native. The burden of proof would rest upon those psychologists who contend that they are native, and the writer believes that the logical arguments brought forward in support of the contention are fallacious. The tests of stereotyped performance, universality, and wide distribution are not reliable. In general there is a lack of definiteness in analysis, failure to observe a careful definition of terms, and neglect to consider the neurological and physiological problems involved.

The difficulties of neurological explanation are illustrated

by the consideration that an instinct to love one's mother would involve the innate possession of a receptive mechanism fitted to respond to the sight of this one woman's face and no other human face. To assume a gregarious instinct would, as Allport points out, imply that a child would respond natively to the absence of a stimulus, a situation difficult to conceive in neurological terms.

We may make the following tentative classification of native responses based on facts so far observed:

1. Reflex adjustments of the sense organs.
2. Locomotion responses
Examples: the "extensor thrust," alternate stepping movements, and probably some reflex coördinations involved in such acts as rolling over and sitting.
3. Vocalizations
4. General negative responses
 - (a) Starting reflexes
 - (b) Withdrawing reflexes
 - (c) Rejecting reflexes (including defense movements such as striking out when hit, and pushing)
 - (d) Anger responses
 - (e) Fear responses
5. General positive responses
 - (a) Reaching and grasping
 - (b) Hunger reflexes
 - (c) Sex responses
 - (d) Sensitive zone responses

It is evident that under each heading of this classification there belong a very large number of simple reflexes and groups of reflexes, for each of which there appear to be determinate native stimuli. Only a very limited number of these groups of reflexes are complex pattern responses which meet the standard or Jamesian definition of instinct, and

these are chiefly organic activities. Many psychologists, therefore, prefer to give up the term entirely and to speak merely of native reflexes or groups of native reflexes as distinguished from conditioned reflexes and habits, which are acquired. This usage maintains a clear distinction between native responses and those which are learned in part or in whole. It also avoids the difficulty involved in using a term which has many confusing associations, and which is bound to convey different meanings to different people. On the other hand, some psychologists wish to retain the term, and there is no reason why it cannot be useful, if the sense in which it is used is made perfectly clear, so that parties to a discussion know just what they are talking about. In the writer's opinion the most clear-cut definition is the common one elaborated in this chapter.

The outline also suggests that what the older writers called instincts were in reality simply general *classes* of native responses, such as sex, self-preservation, and play. These terms are useful in classifying a multitude of responses but it is clear that they do not correspond to any specific forces, entities, or receptor-neural-effector mechanisms, as these writers implied. Such general terms when used to-day serve merely as blanket terms to cover up our ignorance of the real conditions involved, and as such tend to discourage careful thinking. The ordinary use of the term instinct is like saying that the sky is blue because of its deep cerulean hue. If we really want to understand why children act as they do we should not be satisfied with vague general terms, but should insist on a careful analysis of the factors involved.

It should be needless to say that to deny the instinctive character of an act is not to deny its existence. Play and fighting, imitation, aggressiveness and sympathy are not

instincts, according to our view, but they are nevertheless very important factors in the mental life of the child. Nor do we take away from the value of any activity if we say that it is not an instinct. Maternal behavior is just as important whether regarded as partly native and partly acquired, or as wholly native. In fact, some might regard maternal love as all the more significant if it grows out of daily personal experience, instead of appearing mechanically, full-fledged. Such considerations, however, should not influence our scientific views — our aim is to understand the child, and in order to accomplish it, we must simply do our best to discover the actual truth.

CHAPTER V

PERCEPTUAL-MOTOR LEARNING: THE CONDITIONED RESPONSE

THE NEWBORN guinea pig is in appearance a miniature of the adult, with fully formed body, thick glossy hair, and bright, darting eyes. His behavior also is surprisingly complex. He can lift his head, stand up, and move about almost at birth.¹ An infant monkey observed by Lashley and Watson was much less advanced at birth, and developed more slowly. It was weeks before he could get about in the quick effective manner of the day-old guinea pig. But by the thirteenth day he was creeping, and toward the end of the day he began to walk. At fourteen days this infant could reach out and grasp objects quickly and accurately.² In comparison with these animals the human infant is very weak and helpless. He cannot grasp objects before he is four months old, nor can he even sit up until about the age of six months. Many children do not walk about freely until the middle of the second year or later.

As John Fiske long ago pointed out in a famous essay,³ this helplessness of the human infant is correlated with a

¹ ALLEN, JESSIE, "The Associative Processes of the Guinea Pig," *Jour. Comp. Neur. and Psychol.*, 14: 293-359 (1904).

² LASHLEY, K. S., and WATSON, J. B., "Notes on the Development of a Young Monkey," *Jour. Animal Behavior*, 3: 144-139 (1913).

³ FISKE, JOHN, *The Meaning of Infancy* (Houghton Mifflin, 1909).

much greater capacity for learning than any animal possesses. The fact that the baby has so few fixed modes of response, and exhibits such a wealth of unorganized, not immediately adaptive activity means that his behavior is capable of modification in almost endlessly varied ways. He will very soon take on new modes of response. He will begin to act, to feel, to talk, and to think in the most complex ways. The effectiveness of this learning will depend partly upon the capacity of the individual child, but for the most part upon the type of training and education which he receives. The infant mind is not, as Locke thought, a fair white sheet of paper, nor are all minds at first alike. But the form which mental adjustments take, as well as the degree to which mental activity is effective, is certainly closely dependent upon the specific experience of the individual organism.

Changes in native responses which are due either to strengthening through exercise, or merely to increase in size and strength, should be distinguished from genuine learning, which involves the acquisition of new types of response, and which is based upon the retention of the effects of past experience. Native responses tend to become stronger and more easily elicited through mere repetition. It has been shown that while newly hatched chicks begin immediately to peck at various small particles scattered on the ground, they at first miss a small percentage. After a few trials they miss practically none, although it is some time before they perform perfectly the complete reaction of striking, seizing, and swallowing.⁴ Human infants not infrequently refuse to take the nipple at first, but after a little practice their lips close upon it at the first contact and vigorous sucking goes

⁴ MOSELEY, DOROTHY, "The Accuracy of the Pecking Response in Chicks," *Jour. Comp. Psychol.*, 5: 75-97 (1925).

on. Of course it is not possible entirely to separate the effects of such "use" from the effects of genuine trial and error learning.

Again, many changes in behavior are due at least in part to mere increase in bodily size and strength. For example, when the baby first holds his head up it vacillates markedly, but in a few weeks he holds it up steadily. Infants of four months, if placed in a sitting position, almost invariably topple over when support is withdrawn; but by the age of eight months practically all babies can sit alone without support. Growth in size and strength of particular muscles seems to be at least in part responsible for these changes in capacity.

Learning may be said to take place in two main ways. The first is the conditioning of responses by substitution of stimuli, the second is complex learning or habit-formation. In this chapter we shall treat of the process of conditioning in children, reserving for later chapters the discussion of the more complex type of perceptual-motor learning and also of the complex learning which takes place on an ideational level.

Definition of Conditioned Response.—Native or unconditioned reflex responses are defined as responses elicited without learning by particular or "unconditioned" stimulating situations. A conditioned response is, then, one which is called out by a stimulus which is natively inadequate to elicit that response. It is only the whipped dog that cowers at the sight of a stick held in a certain way; only the burnt child who shrinks from the fire.

Importance of Conditioning in Children.—It has not been until recent years that psychologists have come to recognize the significance of this simple type of learning in early childhood. It was experiments on animals and on

human adults which first suggested that conditioning is particularly important in children. Several features of the conditioned reflex as determined in these experiments pointed to that conclusion. In the first place, the fact that conditioned reflexes are readily established in very simple animals such as insects,⁵ suggests that they may occur in a very simple stage of human development, namely in infancy.

In the second place, it was found that in many cases the conditioning occurred without awareness on the part of the subject. Examples are the early experiments of Twitmyer, whose subjects were surprised to find their knees bending in a reflex jerk at the sound of a bell, as if against their will; and the success of Cason in conditioning the contraction of the pupil of the eye to a sound in place of a light, with the subjects unaware that the modification had taken place.⁶ Such experiments as these suggest that a good deal of modification of fundamental responses may occur unconsciously in early life.

We should, of course, expect children to forget the origin of responses acquired in the first two years or so; but one might expect that they would remember the origin of responses which they learn to make after they can talk. The experiments, however, make it easy to see that a good deal of such unconscious learning could go on throughout childhood, as in fact throughout life. They also make it easy to see that certain common responses such as fear of the dark

⁵ For example see WODSEDALEK, J. E., "Formation of Associations in the May-*fly*," *Jour. Animal Behavior*, 2: 1-19 (1912); also THOMPSON, E. L., "An Analysis of the Learning Process in the Snail, *Physa Gyrina Say*," *Behavior Monographs*, 3, No. 3 (1916).

⁶ TWITMYER, E. B., *A Study of the Knee Jerk*, Univ. of Penn. Ph.D. thesis, 1902, reported by Cason in "The Conditioned Reflex . . . as a Common Activity of Living Organisms," *Psychol. Bul.*, 22: 445-472 (1925); CASON, HULSEY, "The Conditioned Pupillary Reaction," *Jour. Exper. Psychol.*, 5: 108-146 (1922).

or attachment to parents might early be fixated, and so automatically elicited as to seem to the individual inborn or "a part of him."

General experiments on the conditioned response have led to a third conclusion which is important for child psychology, namely, the conclusion that under appropriate circumstances conditioned responses may be attached to any stimulus whatever. Pavlov showed that by presenting food to his dogs simultaneously with various colors, sounds, smells, and contact stimuli of different sorts, any of these would, after a little practice, evoke the salivary reflex. It is of especial interest, from the point of view of possibilities of training, that internal stimuli may serve as conditioned or substitute stimuli. Kinæsthetic stimuli serve this purpose in the experiments in which May and Larson, using a modification of Pavlov's method, trained dogs to react positively to food when the right hind leg was rigidly extended, and negatively when the leg was in any other position.⁷

Complex "physiological states" may also become conditioned stimuli. For example, Feokritova accustomed a dog to taking food every thirtieth minute, and then tried the effect of omitting the feeding at some one of the thirty-minute intervals. The result was that at the proper time the secretion of saliva appeared "spontaneously," in the absence of the food.⁸ In other words, the internal physiological state served as a conditioned stimulus to elicit the salivary response. This is the sort of thing that occurs when a three-weeks-old baby, which has been fed regularly every three hours, stirs and begins to make sucking movements or to cry when the three-hour period is up. This behavior occurs

⁷ MAY, E. S., and LARSON, J. A., "Posture-sense Conduction Paths in the Spinal Cord," *Amer. Jour. Physiol.*, 50: 204-208 (1920).

⁸ PAVLOV, I. P., *Conditioned Reflexes*, pp. 41-42; 103-106 (Oxford, 1927).

because at the end of the customary interval there is a particular internal stimulating situation, including perhaps chemical changes, a certain degree of muscle contraction, and other bodily conditions, and the total bodily situation at this time constitutes the conditioned or substitute stimulus.

The fact that any stimulus, external or internal, simple or complex, may become a conditioned stimulus under certain circumstances is, then, another reason for supposing that the process of conditioning is very important in early development. Babies as well as young children, in the course of their almost incessant activity, must, it seems, be widely conditioned to constant or frequently recurring features of their environment.

A fourth general finding which is also of great importance for child psychology is the discovery that, theoretically, any response in any part of the body may become attached to a substitute stimulus. Responses in either striped or skeletal muscles, involving overt activity of the fingers, arms, legs, and trunk, can be readily conditioned.⁹ So can complex responses involving internal smooth muscles as well as skeletal muscles. For example, Krylov, in the course of some experiments had occasion repeatedly to give hypodermic injections of morphine to certain dogs, the injection being followed by profuse secretion of saliva, vomiting, and then sleep. After five or six days he found that preliminary operations such as baring an area of skin, wiping with alcohol, and taking out the syringe, were sufficient to produce all of these symptoms.¹⁰ Not only can such glands of external secretion as the salivary, sweat, and stomach glands be made to secrete in response to "inadequate" stimuli; but so too, it seems, can the glands of internal secretion, including the adrenals, the thyroid, and the gonads or sex glands.

⁹ WATSON, J. B., "The Place of the Conditioned Reflex in Psychology," *Psychol. Rev.*, 23: 89-116 (1916).

¹⁰ PAVLOV, I. P., *op. cit.*, pp. 35-36.

The above findings indicate that the internal muscular and glandular responses which are basic in emotion can be conditioned, as well as vital reflexes (digestive, eliminative, and the like) which are important in maintaining bodily health. The apparent fact that fundamental internal responses can be early and easily modified, suggests that "nervous instability" which appears to be innate may in many cases have been acquired. At any rate, considering the fact that all types of response are capable of modification in this way, it is clear that the concept of conditioning may be helpful in explaining the origins of many significant mental traits or conditions.

RUSSIAN EXPERIMENTS ON CONDITIONING IN CHILDREN

It is only in Russia that really extended and significant experiments have been carried on with children themselves as subjects; and since most of the published reports have not been available in translation, it is not now possible adequately to estimate their significance for child psychology. We must content ourselves, therefore, with a brief description of some of the work.

It was the physiologist Krasnogorski, a student of Pavlov's, who, in 1907, first applied the conditioned reflex method to the study of children.¹¹ His general method was to feed chocolate to the blindfolded subjects simultaneously with the ringing of a bell or contact stimulation with a brush. After a few trials, mouth opening and swallowing movements, caused by an accumulation of saliva, occurred immediately on presentation of the conditioned stimuli. The results of this early work indicated that conditioning occurs more readily in bright subjects than in dull subjects; and that the methods used are a reliable means of clinically

¹¹ IVANOV-SMOLENSKI, A. G., "On the Methods of Examining the Conditioned Food Reflexes in Children and in Mental Disorders," *Brain*, 50: 138-141 (1927).

separating pathological cases in early childhood.¹² Mateer sought to verify these conclusions in this country in an elaborate investigation of over fifty children aged one to seven years. She used a modified form of Krasnogorski's method, and also gave the subjects standard intelligence tests. She believed that her results did verify the early conclusions of Krasnogorski, and that they also revealed important differences in different age groups and between the sexes. But a critical analysis of the findings, as reported at length in her book *Child Behavior*, does not disclose an adequate basis for her statements. The number of cases in the various age, sex, and intelligence groups is few, the statistical treatment is unreliable, and the interpretations are doubtful at almost every point. Yet her work, as essentially pioneer in character, is of interest and importance as demonstrating the possibility of applying such methods on a large scale.¹³

Krasnogorski himself has worked on steadily. He now studies directly the salivary reflex, instead of mouth opening and swallowing responses, and employs the most careful means of controlling the experimental conditions and of recording the salivary as well as other responses.¹⁴ Gradually, with the coöperation of students, he has accumulated results which are of great significance for the building up of sound theories of child behavior. For the sake of illustration we may describe briefly the results of one type of experiment carried on by him.¹⁵ It had already been found

¹² This description of KRASNOGORSKI's work is based on the account by FLORENCE MATEER, in *Child Behavior*, pp. 78-86 (Badger, 1918).

¹³ MATEER, *op. cit.*

¹⁴ The methods now in use were demonstrated to the author during a recent visit to Leningrad.

¹⁵ KRASNOGORSKI, N. I., "The Conditioned Reflexes and Children's Neuroses," *Am. Jour. Diseases of Children*, 30: 753-768 (1925). Some of the results presented in this article are summarized in THOMAS, W. I., and THOMAS, D. S., *The Child in America*, pp. 507-515 (Knopf, 1928).

in Pavlov's work with dogs that these animals could be trained to discriminate differences in tones. For example, if food was presented always with a tone of two hundred and sixty-four vibrations per second but not with a tone markedly higher, the dogs would soon learn to respond with salivary secretion to the one tone but not to the other. But when the difference between the two tones was gradually shortened so that discrimination was more difficult, the dogs showed a tendency to "break down," and to fail to make the well established differentiations as well as the more recently acquired ones. The breakdown took the form of general inhibition in some animals and of extreme excitement in others. Thus we have in the dogs experimentally induced conditions strikingly suggestive of the manic and depressive types of neuroses in human beings.

Krasnogorski found that children, under similar conditions, reacted similarly. To take one example, a child of six was trained to respond by conditioned mouth-opening and salivary responses when a metronome was beating at the rate of 144 strokes per minute, but not when the rate was 92 strokes per minute. This was done by always accompanying the first stimulus with feeding, and never giving food with the second. When this differentiation was made, the child was taught in four trials to respond to 144 beats but not to 120 beats; but during these trials he began to be irritable. When an effort was made to establish a differentiation between 144 beats and 132 beats, the subject became more irritable and nervous. Moreover, he no longer made even the recently learned differentiation between 120 and 144 beats. During the fourth day's experimenting in the effort to establish the most difficult differentiation (between 144 and 132 beats), the child went to sleep. Because of this non-coöperativeness and "general inhibition" the experiment was then discontinued.

In other series of experiments the difficulty of the task was increased, not by teaching progressively finer discriminations as in the example given, but by requiring the subjects to react after increasingly long periods of delay. Delayed reflexes are formed by presenting the unconditioned stimulus, not immediately after the beginning of the conditioned stimulus (*e.g.*, sound of bell), but at a definite interval thereafter, let us say fifteen seconds. In that case, after a few repetitions of the combined stimuli, the bell alone will elicit the response, not at once, but after a delay of fifteen seconds. In succeeding experiments the subject may be trained to respond after longer and longer periods of delay, up to several minutes. But in the course of the training the children began to react in somewhat the same way that they reacted when required to make fine discriminations. In some subjects there was a tendency toward drowsiness, the conditioned reflexes could no longer be evoked, and the children began to sleep during the experiments. In nervous children the effect was more pronounced. One subject, for instance, reacted at first with extreme inhibition, then, in later trials, with marked excitement.

Krasnogorski finds significant differences between normal and abnormal children in respect to their modes of response to these experimentally imposed strains. He suggests that in normal children conditions of inhibition and irritation easily replace one another, according to circumstances, but that in pathological cases the flexibility of the balance is lost. Intensive conflicts between the tendencies to excitement and inhibition, Krasnogorski believes, form a favorable soil for the origin of different neuroses in childhood. "Both physicians and teachers," he says, "must endeavor to strengthen and train the child in forming inhibitory reflexes and in limiting irritation by inhibition from its earliest age, because

all discipline and education is an uninterrupted limitation of reaction by inhibition. On the other hand, they have to guard carefully the weak, developing nervous system from the catastrophic conflicts of irritation and inhibition."

By the application of such methods as Krasnogorski has developed we may sometime gain a much more fundamental insight into the origin of nervousness in children than is possible through clinical study alone. The "artificial neuroses" created in the laboratory are of short duration and, according to Krasnogorski, leave no undesirable effects. In one sense, as he says, every conditioned reflex is a neurosis. By studying experimentally induced "breakdowns" in simple forms and under controlled conditions, we may achieve results that will be highly important in supplementing clinical study.

Another student of Pavlov's, Ivanov-Smolenski, has in recent years carried on significant experiments with children.¹⁶ He has worked not with a genuine native reflex, but with the learned response of grasping a rubber bulb on sight of food. As a result of many experiments by himself and coworkers he concludes that it is possible by his experiments to distinguish three groups of children: healthy children in whom positive and inhibitory conditioned reflexes are formed quickly and remain stable; children in whom nervous irritation is predominant; and children in whom inhibition is more prominent than irritaton.

Some interesting work employing conditioned reflex methods is being carried on at the Leningrad "Institute for Brain Investigation" of which Osipov has been the head since the death of Bekterev. In one of the divisions of the Institute, under the direction of A. L. Schnirman, investigations are being made of "associative reflexes" in children of

¹⁶ IVANOV-SMOLENSKI, *op. cit.*

school age, and it is believed that they already throw important light on individual differences and problems of personality in children.¹⁷ But the most significant work at this Institute, from the point of view of the present chapter, is the study of conditioning in infants which is being carried on under the direction of Shchelovanov.¹⁸ One group of subjects consists of ten infants who are living at the Institute with their mothers, having been brought there direct from the maternity hospital. They will remain until the age of two years, and this makes possible observation and experiment under very favorable conditions. Each week a detailed record is made of the behavior of each child over a twenty-four-hour period, a notation being made for each half minute.

Of the findings about early conditioning only one or two may be reported at this point. The earliest true conditioned reflex which it was possible to isolate under controlled conditions was the making of rhythmical sucking movements of a definite character while the infant was seated on the mother's lap but before he was given the breast. This occurred between three and four weeks of age. Careful tests showed that it was not the odor of the milk, the odor or

¹⁷ These experiments were observed by the author. An article reporting one of the investigations is: ILJINSKII, P. N., "Izmenenia v sochetatno-reflektornoi deiatelnosti lichnosti pod vlianiem socialnogo obraza," *Voprosy izucheniya i vospitaniya lichnosti*, 1 & 2, 3-8, 1929. ("Changes in the Associative-reflex Activity of Personality under the Influence of a Social Example," in the periodical *Problems in the Study and Education of Personality*, Nos. 1 and 2, pp. 3-8, 1929).

¹⁸ The following account is based partly on notes taken by the author during a recent visit, but chiefly on the following article, kindly translated for the author by Mrs. Vera Mintz: DENISOVA, M. P., and FIGURIN, N. L., "K voprosy o pervykh sochetatelnykh pishchevykh reflexakh u grudnykh detej" ("On the Question of Conditioned Food Reflexes in Sucklings"). This article is one among a large number published in a volume of collected reports of the work in Shchelovanov's division, *Voprosy geneticheskoi reflexologii i pedologii mladenchestva, sbornik pervyi*, pod redakciei N. M. Shchelovanova, 1929. It is published by Gosudarstvennoie Medizinskoie Izdatelstvo (State Medical Press), Moscow and Leningrad.

sight of the breast, the sound of the mother's voice, the sight of her face, or the warmth of her body which had acquired the property of eliciting the response, but the complex positional stimulus, which must involve a mass of cutaneous, kinæsthetic, and other types of stimulation. The rhythmical sucking occurred when the infant was held in the position for nursing by a man with face covered who did not speak. In no other than this definite position did the response appear.

By systematic presentation of auditory and visual stimuli at the time of each feeding from the age of about two weeks on, it was found that conditioned sucking responses to the sound of a bell developed in the beginning or the middle of the second month, and similar responses to a red light appeared at two to two and a half months. In the case of one subject the training began later, at the age of one month and twenty-eight days; and in eight days, after only forty-eight trials, the conditioned response to the sound of a metronome was established. This suggests that age or "maturity of the nervous system" is as important a factor in early conditioning as number of trials. More data are needed.

It is clear that the Russian experimental work on conditioning in children, initiated by Krasnogorski in 1917, has by now produced results of great importance for child psychology. We shall hope that in the future more detailed reports of the work in that country will be available in English.

AMERICAN INVESTIGATIONS

MEANWHILE, some less elaborate and less fundamental experimentation on conditioning in children has been going on in this country. Watson and Rayner, while they were making the study of native responses discussed in the last

chapter, were so impressed with the probability that much apparently instinctive emotional behavior is probably conditioned, that they decided to build an experimental fear in the laboratory. In two trials they established a fear of a white rat in an eleven-months-old boy, by making a sudden loud noise behind the child's head just as he was reaching out for the animal. This fear was present in mild form a week later, and after strengthening by several more combined presentations of sound and rat, was elicited instantly at the mere sight of the animal. Moreover a transfer to similar situations was made, in that the child now reacted negatively also to a rabbit, a dog and a fur coat. The fear of the rat was still present when a test was made one month later.¹⁹

The strength and persistence of what Watson calls "home-made fears" may be inferred from the difficulty encountered in the attempt to "cure" them. Mary Cover Jones has made interesting studies of the relative efficacy of various methods. She concludes that the only permanently efficacious one is that of direct reconditioning. This is illustrated by the case of the little boy Peter, who was afraid of rabbits. The plan followed was to have a rabbit in sight, but not close by, while Peter was enjoying a good meal. Then at later meals the rabbit was gradually brought nearer, until finally the generally pleasant positive responses which were the rule at dinner time became attached to the animal as a part of the general situation. Finally Peter patted the rabbit and spoke to him, and the fear was gone, not to return.²⁰

Interesting experiments have been carried out in this coun-

¹⁹ WATSON, J. B., and RAYNER, ROSALIE, "Conditioned Emotional Reactions," *Jour. Exper. Psychol.*, 3: 1-14 (1920).

²⁰ JONES, MARY COVER, "The Elimination of Children's Fears," *Jour. Exper. Psychol.*, 7: 382-391 (1924). See also article by the same author, "The Case of Peter—A Laboratory Study of Fear," *Ped. Sem.*, 31: 308-315 (1924).

try in conditioning milder affective responses in children. For example, a child is conditioned against a telegraph snapper by sounding it when vinegar is given.²¹ But so far American work on conditioning is illustrative rather than fundamental.

Conditions Necessary to Establishment of Conditioned Responses. — A knowledge of some of the conditions which have been found important in the experimental establishment of conditioned responses, will suggest practical applications in the training of children. Such knowledge may aid us not only in establishing desirable responses, but also in "unconditioning" a child in whom unfortunate reactions have been built up.

1. *Repetition.* One of the fundamental generalizations which have been established is that repetition of the combined stimuli, conditioned and unconditioned, is necessary if an acquired "reflex" is to continue to function. The experiments show that if the conditioned or substitute stimulus, after the reflex has just been established, be applied alone for some time without any "reinforcement" by the original unconditioned stimulus, then the newly acquired response will soon cease to occur.²² Applying this to child behavior, we might hope that a single unfortunate experience would not produce a lasting conditioning in a child, unless repeated. If, for example, a child has pulled a puppy's tail and has in consequence been bitten by the animal, he will probably acquire a fear of the puppy. But if we can get him later to look at or to pat the puppy without any tail pulling or other unfortunate stimulation, we may hope that in time the fear will disappear. It has been found possible by applying the general principle to cure babies of

²¹ MOSS, FRED A., "Note on Building Likes and Dislikes in Children," *Jour. Exper. Psychol.*, 7: 475-478 (1924).

²² PAVLOV, *op. cit.*, pp. 48-56.

"dislike" of a certain food. The infant has acquired this negative attitude, let us say, when the food was served too hot, or when another interesting activity was interrupted to present it. If the same food is presented at the next meal there will be reinforcement, since "forcing" the food on the child will strengthen the negative response. But if the food is not given at all for two or three weeks or more, and then served calmly with no "fuss" or coaxing, and of course at the proper temperature and in a well-liked dish, it will usually be found that the negative responses have "died out."

On the other hand, Pavlov's experiments on dogs show that sometimes the acquired response is only temporarily abolished, and may reappear "spontaneously" without reinforcement. In fact, Pavlov says, all those conditioned reflexes which have been fully established invariably and spontaneously return sooner or later to their full strength.²³ This consideration should lead us to expect exceptions in children also. Mary Cover Jones found in her experiments on curing fears that the little boy who had apparently, through familiarity, lost his fear of a rabbit, showed the fear again in full strength after a month's absence at a hospital.²⁴ The only method resulting in permanent cure was, we have seen, that of direct reconditioning in which other responses were gradually substituted for the undesirable one.

Then, too, it is important to consider that reinforcement may occur in other ways than through overt repetition of the essentials of the original situation. J. E. Anderson presents a case showing that a dream may serve as a reconditioning process.²⁵ Newspaper accounts of accidents, fires,

²³ PAVLOV, *op. cit.*, pp. 57-59.

²⁴ JONES, MARY COVER, "The Case of Peter," *op. cit.*

²⁵ ANDERSON, JOHN E., "The Dream as a Reconditioning Process," *Jour. Abn. and Soc. Psychol.*, 22: 21-25 (1927).

or other occurrences, and stories read, listened to, or merely imagined may serve the same purpose. Since the conditioning often takes place on an unconscious level, reinforcement may of course occur even if the child is not aware that the later experiences have anything in common with the one which produced the original conditioning. Indeed the original incident may have been completely forgotten. The study of clinical cases in which recall of traumatic memories has been induced through hypnosis or other means, shows that the original conditioning may be "reinforced," and the conditioned emotion made practically permanent, entirely through such indirect means. Nightmares, much disguised daydreams, books, pictures or music — any stimuli in fact which have elements in common with the original experience — may provide reinforcement.

An example of such indirect reinforcement is the case of DY, studied by W. S. Taylor. DY, as an adult, suffered spasms of the throat accompanied by inexplicable fear, when bathing or drinking cold water. A brief analysis, using hypnosis, brought to light a number of hitherto forgotten incidents of DY's childhood, each of which had contributed its share to the development of these abnormal responses. The experience included being drenched with water from an overturned pitcher, when very small; watching a frog gurgling in a pond; having his leg wedged in a little tub while being bathed; and being scared by a story of an uncle about some "Thing" which might get him, a story told just before he went out into the dimly lit kitchen, alone, to get a drink. A queer reflection in the window suggested a horrible face, of the "Thing"; and just as the water was gurgling out of the sink the small boy's foot caught for a moment in the rug. It is easy to see how all these incidents, happening at various times and not consciously

connected, provided sufficient cumulative strengthening of the original fear responses to the drenching, to result in the phobia and choking. There was evidence also in this case (motions and sounds made while asleep) that there had been dreams in which crucial parts of the fear-situations had been repeated.²⁶

The only cure of such long standing or unconscious conditioned responses consists probably in direct reconditioning, that is, in attaching new and desirable responses to the original emotion-provoking stimulus. In order to do this, it is necessary, of course, to find out just what that stimulus is, and this is why, unless objective investigation reveals the traumatic situation, recall is necessary for cure. In the case of DY cure was effected in hypnosis through "resetting of the memories," that is, attaching significant non-emotional responses (interpretations) to the original stimuli (water, bathing) so that these new interpretative responses would be aroused instead of the old non-adaptive emotional reaction.²⁷

Desirable conditioned responses also, either negative or positive, may of course be established, die out, or be strengthened in the ways described. For example, in a child who has in babyhood become emotionally attached to members of his family because of kindly treatment by them, the "bonds of family affection" will become strong and permanent if the kindness continues. Even if it does not continue beyond the earliest years the attachment may remain, sometimes at an unconscious level, because there has been intensive "practice" in these early years. Then, too, through

²⁶ See TAYLOR, W. S., *Readings in Abnormal Psychology*, pp. 707-724 (Appleton, 1927).

²⁷ For a detailed discussion of the theories underlying the therapeutic method, see TAYLOR, W. S., *Morton Prince and Abnormal Psychology*, chap. x, "The Basis of Psychotherapy" (Appleton, 1928).

indirect means such as play with dolls, the reading of stories, and interest in any activities which indirectly arouse emotional responses important in family life, the basic mechanisms become strengthened. Adults are sometimes surprised, at the death of a member of the family, to see in the intensity of their grief a measure of the love they had thought for years was slight or even lacking.

2. *Relative strength of the stimuli.* A second fundamental generalization from experiment is that mere simultaneous repetition of two stimuli will not result in conditioning unless the strengths of the two stimuli bear a certain relation to one another. That is, the unconditioned stimulus must be biologically stronger than the conditioned stimulus.²⁸ This accounts for the fact that conditioned responses seem to be most readily and most effectively formed in relation to the most biologically fundamental situations—feeding, mating, defending oneself, and the like. Indifferent responses do not, except under special conditions, become linked to substitute stimuli.

Again, the conditioned or substitute stimulating situation, although it must be weaker than the unconditioned stimulus, must have a certain intensity. For example, Pavlov's student, Solomonov, could establish a conditioned salivary response in a dog to a thermal stimulus of 45° Centigrade, but was unable to condition the response to a temperature of 38°, which is only a little above the skin temperature of the dog.²⁹ The fact that in the experiments both conditioned and unconditioned stimuli must reach a certain intensity, and must bear a certain intensity relationship to one another, helps to explain why conditioning in children does not take place in a haphazard way. Intensity, which is re-

²⁸ PAVLOV, *op. cit.*, pp. 30, 31.

²⁹ *Ibid.*, *op. cit.*, p. 31.

lated to biological importance, is thus a significant "ordering" factor.

This intensity relationship is curiously illustrated in the experiments which show that stimuli so intense as to be positively harmful, may under certain circumstances serve as substitute stimuli, if less "intense" than those which they replace. Eroféeva found that in dogs after a number of trials, an electric shock which ordinarily produced marked defence reactions, could be made to produce instead, when accompanied by food a number of times, a positive salivary secretion with no slightest trace of any motor defence reflex.³⁰ This could not take place, Pavlov thinks, were not feeding responses in hungry dogs biologically stronger than defence reflexes.

W. S. Taylor has suggested in a lecture that these experiments provide an explanation for masochism or the enjoyment of self-inflicted pain. We may take for illustration the case of a college girl who, as the middle child in a large family, felt herself as she grew up not only neglected but disliked. The incidents of her childhood which she remembers with most pleasure are those involving physical pain from a cut on the arm, from whooping cough, and from a broken leg. In each case there was tender ministrations, involving patting and caressing, from the mother. It looks as if in both of these examples, the pain stimuli, originally inadequate to produce pleasurable feeling responses, became through these experiences substitute or conditioned stimuli for their arousal. The same girl, when older, engaged for a time in definitely though mildly masochistic practices, such as holding a lighted match near the palm of her hand until it was reddened and sore.

3. *Time relationships of stimuli.* A third prerequisite for

³⁰ PAVLOV, *op. cit.*, pp. 29-30.

establishing a conditioned response, according to Pavlov, is that the two stimulating situations must not only overlap in time, but the conditioned stimulus must begin to operate before the unconditioned stimulus comes into action. Kres-tovnikov showed that conditioning does not take place if the unconditioned stimulus is applied first and the conditioned stimulus later. To illustrate, in the case of one dog the loud sounding of an electric buzzer started five to ten seconds after food was given failed to establish a conditioned reflex even after three hundred and seventy-four trials; whereas when the buzzer was set going before the administration of food only one trial was required before the reflex was elicited by the sound of the buzzer.³¹

This experimental finding, which is particularly well established, suggests significant application to the training of children, especially in the matter of reward and punishment. According to this principle, the reward (stimulus for positive responses) should never precede the act which it is desired to supplant. To assume an illustrative case, suppose a child's infected toe has to be dressed each day. Theoretically if the doctor gives the child candy before changing the bandage it will not become associated with or modify the behavior (crying) following the cutaneous stimulation; but if candy is given during or just after the process it will modify the response, for the rather slight pain or contact stimuli will finally tend to be followed automatically not only by shrinking and crying responses, but also by positive salivary and mouth-closing responses to the candy. Thus the crying may be lessened or inhibited, and on successive days the child may submit to the operation with increasing cheerfulness. In this case the unconditioned stimulus is gustatory (taste of candy), and the reflex responses are secre-

³¹ *Ibid.*, *op. cit.*, pp. 26-28.

tion of saliva and other positive feeding and emotional responses. The conditioning stimulation is the cutaneous (pain) stimulation involved in dressing the sore toe.

4. *Absence of novel distracting stimuli.* In the experimentation with dogs, the Russian investigators found that the occurrence of irrelevant or unaccustomed stimuli, such as street noises or the presence of a visitor, served as distractions, temporarily abolishing responses already conditioned, or delaying the formation of new ones. But any novel condition, if it remained constantly present, was soon adapted to and the learning went on as before.³² Infants behave very much like dogs in this respect. A baby will not respond in the usual way at his dinner table if a stranger is present or a new nurse takes charge of him. For the establishment as well as the continued smooth functioning of the fundamental conditioned responses in eating, sleeping, and the like, calmness on the part of attendants and regularity in routine are essential. If it is necessary that the baby eat or sleep or sit on his nursery chair while other things are going on in the room, it is usually better to have the other activities a part of the situation from the start and all the time. Whenever unusual, painful, or otherwise distractive stimuli occur, there is a chance of disorder. Babies are not at their best when company is present, nor when subjected to more or tighter clothing than usual, nor when in strange surroundings. When they are older they are able to interpret such new situations, and thus they learn in various ways to adapt themselves; but as babies they react much as other simple animals do, their responses being for the most part on a perceptual-motor level.

5. *Good physical condition.* Finally, Pavlov points out that if conditioning is to occur readily in his animal sub-

³² PAVLOV, *op. cit.*, pp. 45-47.

jects, they must be alert and wide-awake, and in good health. It is also probable that in infants and young children the physiological state is very important in the simple but extensive learning which is the basis of later mental development. Sometimes cases of supposed innate mental defectiveness in older children can be best explained as due to lack of proper conditioning in infancy, as the result of malnutrition or illness. Mrs. E. A. Cowan has shown how, in one such case, a child's intelligence quotient was raised practically to the normal level through special intensive training by motor reconditioning methods.³³

Having considered experimental evidence for the importance of conditioning in childhood, and having discussed the circumstances under which this fundamental type of modification occurs, we may now inquire how prevalent and important conditioning actually is in certain particular aspects of child development, as studied by observers of children. Theoretically, through proper conditioning, fundamental habits of sleep, feeding, and elimination can be very early established.

Observations of Conditioning in Children. — By this time numerous observations of individual babies have shown that the theories do indeed work, with great benefit to the child and to the household.

1. *Habits of sleep, feeding, and elimination.* If a baby has been taken up regularly for several days just at the end of a particular stretch of time, so many hours after feeding, no more and no less, then he will normally be active at just about that time. A healthy, well-fed baby, after regular and systematic training, with no exceptions allowed, will not wake up and cry before the proper time. He may

³³ COWAN, EDWINA A., "Results of Motor Reconditioning Methods Used in Training a Backward Child," *Jour. Genetic Psychol.*, 35:98-104 (1928).

awaken, but he will not cry. In this case the substitute stimulating situations are doubtless very complex, including not only kinæsthetic stimuli resulting from changes in tonicity of muscles, but also varied stimuli from organs such as the bladder and the stomach.

Regular bowel movements, too, can be established at least as early as two months, through similar systematic training. The act is first elicited by alimentary stimuli, and is conditioned to postural, cutaneous, and environmental stimuli, so that it occurs at a certain time and place. Many "baby books" now give directions for such training. The control of the bladder is more difficult and can not be achieved so early, but similar principles have been found to apply. Investigations of such habits as these are now going on in nursery schools and behavior clinics, and it is becoming more and more clear that effective and early conditioning of this sort is desirable as a foundation not only for the physical health of the child but for his mental health.⁸⁴

2. *Responses to handling and care.* These are certainly very early conditioned. Gesell, as the result of observations in connection with his preschool clinic, believes that much important learning goes on even in the first days of life; and that hence education should begin with the day of birth. In the first two weeks, Gesell says, "the child undergoes remarkable development. . . How precociously and efficiently he exhibits his powers of learning is illustrated

⁸⁴ See BLANTON, S. B., and BLANTON, M. G., *Child Guidance* (Century, 1927), recommended as the best practical treatment now available; FENTON, JESSIE, *A Practical Psychology of Babyhood* (Houghton Mifflin, 1925); *Infant Care*, U. S. Dept. of Labor, Children's Bureau Publication, No. 8, Washington, D. C.; and as an example of the more strictly controlled and scientific approach, the monograph, *Observation and Training of Fundamental Habits in Young Children*, by BOTT, BLATZ, CHANT and BOTT, *Genetic Psychology Monographs*, 4, No. 1 (1928).

by a certain infant who recently came to our attention. In the first day of life this infant cried at every new pronounced stimulus — as soon as he was picked up he cried; he ceased to cry when allowed to lie quiet. In two weeks his social environment induced a complete reversal of this relation between stimulus and response. He cried while he was in the crib; he ceased to cry when picked up. If he learned this in two weeks what can he not learn in twice two weeks, in two months, and in four months?"³⁵

3. *Emotional responses.* A third type of behavior in children which can most adequately be explained on the basis of the acquisition in early childhood of conditioned responses, is emotional response toward definite objects or persons. We have seen that controlled observation furnished no evidence that fear responses to animals, the dark, and the like are inherited. When present, they are probably due either to extreme suddenness or to great intensity of stimulation; and in general are readily explicable as conditioned responses. The child might fear the lightning since it often occurs in connection with the sound of thunder. He might fear the dark after it is associated with stimuli involved in stumbling or falling or having colic in the dark, or, later, with tales of terrible things happening in the dark. Any animal which at times makes loud noises or sudden rushing movements might evoke in a little child a fear response which, if the experiment of Watson on Albert holds good, might readily transfer to other similar animals. Many published reports of the behavior of individual children confirm, as we have seen, the experimental findings.

We also find that positive emotional responses toward others develop in infants under just the circumstances which

³⁵ From *Mental Growth of the Preschool Child*, by ARNOLD GESELL. Copyright, 1925. Reprinted by permission of The Macmillan Company, Publishers.

are favorable to conditioning. We may illustrate with one of these "love responses," namely, smiling. In the first few weeks the writer's daughter smiled only when stroked or patted; or when in the bath, in response to similar stimulation of "sensitive zones"; after feeding, in reflex response to intraorganic stimuli; or finally when her clothing was taken off and she was allowed to stretch and kick (again responses chiefly to intraorganic stimuli). Now while feeding and caressing the baby, the writer habitually "talked" to her in tones rather higher than usual. On the day after the infant was two months old the writer noticed for the first time that she smiled at once when spoken to, before a move was made to take off the covers. After that the writer could usually produce a smile by her voice alone.

In the twelfth week the writer had noticed for the first time that the baby smiled readily when her mother, neither bending nor talking, looked at her. This is the beginning of the "recognition" of faces. In it we observe a reflex emotional response called out by a complex stimulating situation which was formerly entirely inadequate to produce the response.

Notes on the behavior of the same baby during the nineteenth week indicate definite progress in the development of emotional attachments. Up to this time the baby's father had taken practically no direct care of her, and she paid little attention to him. The notes for June 29 say, "Father spoke to her repeatedly in bassinet before feeding—she wouldn't smile. Did readily when mother spoke." For the next five days the father, for special reasons, took a good deal of care of the baby, particularly on the last two of these days when her nurse was away. He said that, having been impressed with the fact that she did not seem to "know" him, he made a special point of talking to the child while

playing with her and caressing her. For July 3 the notes read, "This afternoon while she was lying on the couch her father spoke to her. She at once looked at him and smiled, and repeated this on more talking. He did not meanwhile make a move to pet her. Father said she had done the same in the morning for the first time." It seems entirely probable that the intensive practice of the last few days had completed the process of conditioning to the father's deep voice, and perhaps to the sight of his face. It is clear that positive emotional responses develop in connection with the stimulating situations most frequently encountered.

Later as the baby learns to react more differentially to complex patterns of stimuli (that is, when it learns to distinguish different faces), positive emotional responses are most readily and frequently made to those persons who most often feed, bathe, and play with the baby. Thus, a little boy, observed by the writer at the age of eleven months, responded much more affectionately to his nurse than to his busy mother or to his aunt. Why does the baby usually love the mother best? Because it is she who feeds him, plays with him, and caresses him most. At the same time the baby is learning to love the mother, she is also learning to love the baby. Why is the mother more devoted to the baby than the father? Is it because of the "maternal instinct"? No, it is because she herself, through constant care of the child, has become conditioned so that the touch of the little lips or fingers, the smile, and the voice of the child awaken definite emotional responses. These repeated experiences result in a gradually increasing attachment for the baby, and this acquired attachment, along with the ideational responses which she has learned to make in such a situation, constitute her "mother love."

Thus mother love, far from being a blind "instinct," is really a complex sentiment founded upon a rich personal experience. In civilized women it involves acquired memories, hopes, plans, and ideals which make the mother's attitude toward her child one of the most significant factors in human progress. The conditions commonly forced upon every mother, which demand at least suckling of her baby, are such as would lead in nearly all to warm love, but the universality of the "conditioning" is no proof of its inherited character. Inquiry among educated women who report their feelings frankly indicates that they do not feel a rush of love as soon as they gaze upon their first-born, but that instead they find that deep love develops gradually. A second baby is apt to be "loved even before it is born," the previous experience having so conditioned the mother that she responds to many associated stimuli with pleasurable emotion. If this theory of emotional conditioning holds good, we should expect reciprocal love between father and baby to develop in proportion to the amount of loving attention given by the father. This seems actually to be the case.

The principle of the conditioned response as applied to emotions is especially helpful in explaining "infantile fixations." In the love of the baby for the parents, and the later childhood love, there seems at present to be no reason for assuming a sexual element, if we define sex behavior as that involving either stimulation of, or response in, the sex organs. This childish love, although strong and grounded on prepotent reflexes, may be a matter essentially of sensitive zone stimulation, involving the substitution in conditioning of other stimulating situations (voice, appearance, and the like) for the original contact-stimulation of these areas.

The love of parents for the baby, however, we might ex-

pect to be from the first partly sexual in character, since the parent has long been so conditioned that stimulation of sensitive zones calls out implicit sex responses (the basis of the emotion of love) in addition to the milder native responses to such stimulation. Especially if either parent is sexually unsatisfied, and hence peculiarly likely to respond sexually, we might expect to find a sexual component in the love responses toward the baby. Yet it is reasonable to suppose that the chief basis of parental love consists of the milder affective responses constituting "the tender emotion," responses not sexual at all. It may be urged that the child needs enough caressing to insure normal emotional development, but that an excessive amount may result in too deep an attachment, a conditioning or "fixation" which may be difficult or impossible to "cure" when the child grows up.³⁶

While the foregoing analysis implies the fundamental importance of early emotional experiences in the development of the child mind, it is very different from the Freudian theory. Sex is here considered to play a very minor rôle in the behavior of infants. The special devotion of a little girl to her father, or of a boy to his mother, is not explained on the basis of a sex feeling for the parent, but as the result of an unusual amount of petting bestowed by the parent. It is the parent, with adult habits and interests, who determines the "fixation." It is the parent, not the child, who has the sex feeling. Later, especially at the approach of puberty, with new sex responses appearing, we might expect a child so conditioned to develop some sex feeling also toward the parent in question. But there is no inherent rea-

³⁶ This point is discussed in a stimulating way by WATSON, J. B., in his *Psychological Care of Infant and Child* (Norton, 1928). The writer agrees with most of this treatment, although she believes that it is going a little too far to advise a shake of the hand as a morning greeting to the two-year-old, instead of a kiss on the forehead.

son, according to the present analysis, why a girl should not develop a fixation for her mother as well as for her father. It seems to be conditions prevailing in the home life, not blind inherent forces, which are the chief determinants of the emotional development of the child.

Just as positive emotional responses to people may be conditioned in young children, so also of course may negative responses. A father who often speaks to a young child in a loud gruff voice, or punishes him by spanking or by the use of a stick, may arouse a shrinking type of fear response. This may become so associated with the father that the child, even when the father is caressing him, may exhibit a timid, shrinking manner. Perhaps in the awe, veneration, or respect with which such a parent may later be regarded we have confused remnants of such early conditioning. Not infrequently the early attitude persists. Many a child does not learn really to love a stern parent until old enough to appreciate the significance of the situation, or, perhaps, never does acquire such love.

4. *Spatially determined reactions.* A fourth type of early mental development which is illuminated by the concept of conditioning is the gradual formation of more and more correct responses to objects in space. These have not as yet been adequately studied. Casual recorded observations indicate that the baby when first able to creep from place to place does not avoid objects, but learns to only gradually. One little girl who rolled readily from place to place for months before she crept, was observed time and again, in going toward some person, to collide with obstacles, such as a chair or the corner of a box or a leg of a table. She began to creep at the end of the tenth month and sometimes when in her play pen, which had vertical bars a few inches apart, she would creep rapidly across the pen and be

brought up sharp against the bars. One day when she was eleven months old, she was playing in a corner of a large room, diagonally across from her father, her pen in the middle of the floor between them. The father called and beckoned her, by moving his feet, to come to him. She started to creep rapidly toward him, in a straight line, looking right through the bars at his shoes. She ran straight into the pen, bumping her forehead hard against the bars. Looking surprised she turned aside, crept along the pen, and when clear of it again, crept on toward her father.

By the time she was a year old, however, the baby was never observed to run into anything. She would creep easily all about the house, aiming for the doors and open spaces, and never trying to creep out of her pen unless it was lifted, when she would instantly scamper off. Probably the main reason why babies do not oftener collide with objects is that they are usually creeping toward something they see clearly, which means that obstacles are not ordinarily present.

It is observed that infants show "no fear of high places," that is, that they creep to the extreme edge of a bed or table, showing no avoiding or fear responses until they begin to fall. Gradually, however, they learn to avoid such places, so that finally they can be trusted even at night to stay safe on a rather narrow bed. Such learning is readily explicable on a conditioned response basis. It is not necessary to assume the development of ideas of space (although they may exist), or any conscious memory of previous experiences or desire to avoid them.

The child learns only very gradually, in a similar way, to react to the size and distance of objects, so that they are easily manipulated. Without the foundation of accurate sensory-motor responses to objects in space which is usually so well laid in the years of infancy, the child would be

at a great disadvantage. The little girl observed by Mrs. Cowan, deprived through illness of the chance to acquire the normal sureness in getting about and in handling things, was awkward, ineffective, and so painfully self-conscious that a most harmful and incapacitating inferiority attitude developed. This eight-year-old child had to go through a long period of training very similar to that which the baby gets in his tumbling, clumsy explorations, before she felt at home in the world. Only then was a normal rate of general mental development possible.

5. *Conditioning in other types of mental adjustment.* We have selected for special attention the part which conditioning has been observed to play in the acquisition of fundamental responses to feeding and care, in emotional development, and in spatially determined reactions. Conditioning is also important, observation of children indicates, in relation to many other aspects of mental life, such as the building of complex sensory-motor habits, speech development, and the formation of motives and social attitudes. Since all of these types of adjustment will be treated in some detail in later parts of this book, we shall not at this point indicate the rôle of conditioning in their development.

Conditioning in Later Life. — While conditioning plays a particularly important part in the mental growth of early childhood, it may occur, of course, whenever circumstances are favorable, throughout life. While it seems probable that by the time the child is five years old the foundations of his peculiar personality are laid, these must be built upon. Early established emotional attitudes may be either reinforced or weakened in accordance with later experience. Through special conditioning speech responses may be modified and fundamental habits changed. And, of course, entirely new responses may be acquired at any time.

It is sometimes urged that psychologists now pay too much attention to unfortunate emotional experiences in early childhood, overlooking the fact that people may be conditioned in undesirable ways at any age. While adults certainly may be so affected, it yet remains true, in the opinion of the writer, that the childhood experiences deserve our chief attention. One reason is that the adult emotional maladjustments which date back to childhood, having received long practice, are likely to be stronger and more difficult of control than those which have been more recently acquired. Again, such deep-seated trends are likely to be more widely ramifying than recent ones, since there has been abundant chance for association with many experiences which have elements in common with the original traumatic experience. Thus in the process of reinforcement there occurs also reconditioning to other situations, and consequently the trend is likely to become more complicated as the years go by.

But the best reason for considering that childhood emotional shocks are more likely to be serious than those which occur later is that they are more readily misinterpreted and "repressed." An adolescent child or an adult is possessed of some wisdom and experience, however crude, which not only gives him a certain measure of emotional preparedness, but which he can apply in the interpretation of a traumatic situation when it occurs. Thus by relating that situation to the rest of his experience, he may learn to substitute more rational responses for the first intense emotional reactions. A child, however, overwhelmed by an entirely novel experience, is much more likely to misinterpret it. Since the horrifying situation is not in any effective way linked up with the rest of his mental life, thoughts about it may rather readily form a closed system, not easily aroused to activity by

the events of his daily life. Thus, "forgotten" or "repressed," that system, which is represented by physiological "traces" in the organism, remains as a source of trouble because it is inaccessible to ordinary thought. No matter how wise the child may grow to be, he cannot readjust to or interpret an experience which he has forgotten. Therefore, although the conscious memory of the event is gone, some of the old emotional reactions continue to recur in similar stimulating situations. Thus it is that maladaptive conditioning from emotional experiences in early childhood is likely to have a far more serious effect than similar conditioning occurring later.

We must recognize, however, that since in most cases it is probably through cumulative conditioning or reinforcement that the original situation becomes serious, the conditionings of later years do indeed play an important rôle in the maladjustment of the adult. It seems that sometimes a very great emotional shock may cause a lasting "neurosis" in an adult whose early experiences have not predisposed him to such reactions; yet general clinical studies as well as recent studies of soldiers who broke down under the strain of war, indicate that in a large number of cases there is evidence of earlier nervousness or instability of some sort. While in some cases this instability may be simply due to hereditary "weakness," in a great many, perhaps in nearly all, it must be interpreted as the result of specific conditioning.

The Conditioned Reflex and General Theory. — From the point of view of general psychological theory, the study of the conditioned response has been especially helpful in throwing light on the very early developments which are often, for want of understanding, vaguely ascribed to heredity, instinct, or the "dawn of intelligence." It has had

a good deal to do with the discarding of the older instinct-hypothesis, and has forced a reconsideration of the whole question of native emotional differences among individuals, the sexes, and different races. It has furnished a good working explanation of types of behavior formerly explained in blanket terms, and has substituted a clear-cut type of analysis for the vague Freudian theories of the infant psyche, infantile fixations, and the like. The conditioned-reflex principle alone will not explain human development, but as one of the factors involved in simple types of learning it is extremely important. It also has its place, as we shall see, in the explanation of more complex behavior.

CHAPTER VI

PERCEPTUAL-MOTOR LEARNING: COMPLEX HABITS

THE SECOND type of learning which helps to explain the rapid mental development of the first few years, as well as the slower mental growth of later periods, is ordinarily called habit formation. This may be largely perceptual-motor or largely ideational. It involves the acquisition of complex series of responses which may be retained and later function adaptively in similar situations, thus enabling the individual to utilize the effects of past experience. Ideational factors become more and more important in learning as the child grows older; but certain types of activity which involve complex coördination in overt adjustment seem to be learned with a minimum of ideation, no matter at what age the learning occurs. In general we may say that between purely perceptual-motor learning and ideational learning there are a great many intermediate types involving varying amounts of ideation. In human beings we should expect to find very little learning or none, which is either purely perceptual-motor or purely ideational. Since, however, in much learning one or the other type undoubtedly predominates, it will be convenient and helpful for practical purposes to analyze them separately.

Although there has been a great deal of careful experi-

mentation on habit formation in adults and in animals, so far very little work has been done with young children. They prove rather difficult subjects for experimentation on account of the difficulty of providing strong enough incentives, of maintaining attention, and the like. Professor Freeman's book *How Children Learn* is thus based almost entirely on experiments with adults or animals.¹ While it seems entirely reasonable to suppose that the fundamental principles of learning are the same for animals and children, it is not clear that the manner of the learning would be the same. Experiments on adults could answer the question why children learn but perhaps not tell us how children learn.

Psychologists have been able, however, on the basis of careful observation of everyday activities, to describe the main features of the learning process. They have long been accustomed to call attention to the wealth of unorganized activity present at the start of the process, and to the gradual elimination of unsuccessful acts. Pechstein and Jenkins give typical illustrations. "The father . . . displayed a gaudy and loud-sounding rattle, a few inches above the chest of the young hopeful. . . In response to the moving object and the resultant noise, the infant fixed his gaze, became somewhat rigid, then suddenly arms and legs, tongue, lips, and other facial muscles, even those of the diaphragm and the internal organs which mediate crying, probably, were called into play. The child became a mass of random movements, these movements being coördinated only to the degree that the arms or the limbs, etc., are originally geared to move simultaneously. In this mass of wiggling, flinging of arms, crying, or cooing lies the basis for the successful reaching reaction. If the right hand bumps accidentally into this

¹ FREEMAN, FRANK N., *How Children Learn* (Houghton Mifflin, 1917).

strange object in space, the grasping reflex of the fingers takes place, and in as unconscious a fashion, the right arm contracts and the rattle is brought to the mouth. . . Then, of course, the father takes the rattle from the child and, after the resultant crying has ceased and order is restored, the learning situation is again staged. Again appears the random out-going of energy into thousands of motor channels and again appears the accidental bumping into the rattle and bringing it to the mouth. In due order, and after many repetitions, the proper reaching reaction alone becomes selected and the remaining movements of the original response are inhibited." ²

Psychologists are beginning to make controlled experimental studies of motor learning in infants, but so far few are at hand. Those which we do have corroborate the common description of the process. Watson studied in several infants the process of learning to grasp a stick of candy, but does not give sufficient quantitative data for a curve.³ The author studied in one subject the process of learning to grasp a rattle. Tests were begun at the age of one hundred and twenty-nine days. The rattle was held directly above and in front of the baby at a distance of six inches for exactly one minute, or until it was grasped. Preliminary tests had shown that in such a situation there was a great deal of diffuse activity of the whole body, with waving of the arms and rapid kicking of the legs especially prominent, and it had been decided to select the number of kicks of the legs ("useless" movements) as a measure of the learning.

The notes recorded at the time on general behavior during the first trial read as follows:

² PECHSTEIN, L. A., and JENKINS, FRANCES, *Psychology of the Kindergarten-Primary Child*, pp. 73-74 (Houghton Mifflin, 1927).

³ WATSON, JOHN B., *Psychology from the Standpoint of a Behaviorist*, pp. 275-278 (Lippincott, 1919).

Steady fixation with very intent look (one slight exception). Fixated again when rattle was shaken. Rattle shaken occasionally during trial. Arms in practically constant motion. Usually alternate. . . . Marked squirming movements of trunk, head, and shoulders. Moved legs in unison a great deal. Waved left foot and spread toes. Knee often held flexed. Kicked right foot and moved it back and forth along sheet. Several times (about three) arms brought toward center, nearly meeting. Vocalization — eager grunting sounds — such as not present during few minutes before and after trial.

On succeeding days the baby had extra practice in grasping, the rattle being presented several times a day. But the daily tests indicate the course of development of the ability. The curve in Fig. 8 shows this progress as measured by decrease in number of kicks of the legs. The notes show that this decrease corresponded to a gradual reduction in the amount of general bodily movement. The infant who at the beginning of the experiment was a squirming, wriggling, excited little animal when the rattle was presented, had in a week's practice learned to grasp the rattle promptly with a minimum of general bodily movement. The notes for the trial, when the rattle was first successfully grasped, state "No squirming or other general bodily movements were observed . . . and there was no vocalization." This held true of later trials.

This experimental observation was concentrated on the period of most rapid learning in a subject who had, through play with her rattle, already acquired some of the elementary coördinations involved. Since only one subject was used, the results do not justify broad generalization. They do, however, furnish an objective record which substantiates the general accounts of infant learning that appear in the texts, and confirm such studies as those of Watson in sug-

gesting that the response of reaching and grasping has to be acquired in the same laborious way that the more complex manipulatory habits of adults are known to be and that it does not depend entirely on the maturation of hereditary mechanisms.

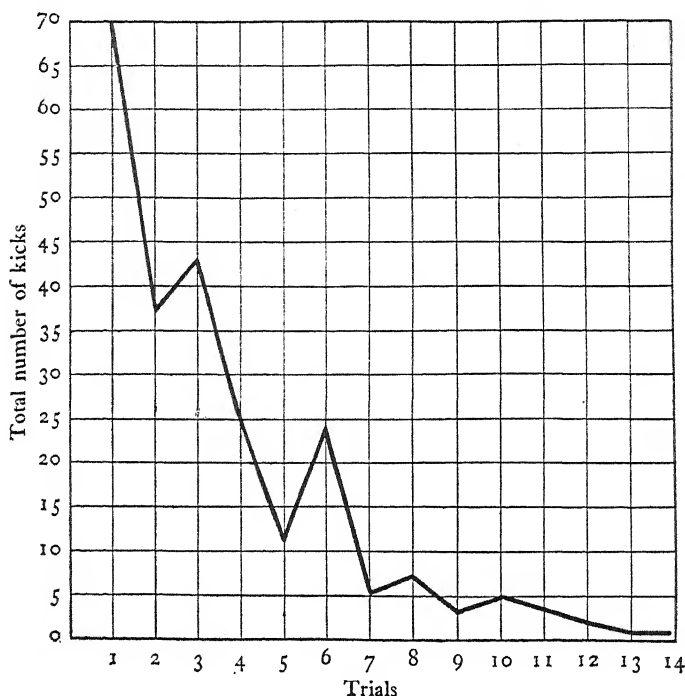


Fig. 8. CURVE SHOWING PROGRESS OF AN INFANT IN LEARNING TO GRASP

The few experiments which have been made on complex perceptual-motor learning in children past infancy, show the same general features. An early experiment of Hicks and Carr is of especial interest in connection with the discussion of the similarity of motor learning in animals, chil-

dren, and adults.⁴ These investigators used as subjects twenty-three rats, five children, eight to thirteen years, and four adults, requiring them to learn mazes of comparable difficulty. The human beings, blindfolded, were told simply that they were to keep moving until they found themselves in the open; while for the rats the motive consisted partly of hunger and partly of the usual tendencies to move about and "explore." Figure 9 shows elimination curves based on the results for time, errors, and distance averaged for each trial. For all the subjects, since the learning is spread out over a number of trials, learning may be said to be gradual. The rapidity of the initial descent of the curves as well as the number of trials required for learning bears no relation to the rational capacity of the three groups, a fact which indicates that *for this type of problem* the ability to use ideas is not an important factor in the learning. The initial slowness of the adults in eliminating time and errors is probably connected with more rational methods of attack which are, however, not particularly efficacious in the present situation.

THE CHIEF FACTORS IN PERCEPTUAL-MOTOR LEARNING

THE experiments and observations on the acquisition of complex perceptual-motor habits enable us to point out the chief factors in such learning.

1. *Motivating Stimulus.* — There would be no use in trying to get a fifteen-months-old child who has just had his dinner to practice eating with a spoon; and no use in expecting him to try to climb up stairs if his mother and his playthings were below. A ten-year-old boy would not spend

⁴ HICKS, V. C., and CARR, H. A., "Human Reactions in a Maze," *Jour. Animal Behavior*, 2: 98-125 (1912).

hours in practicing baseball curves, unless spurred on by recollections of past imperfections in pitching, together with

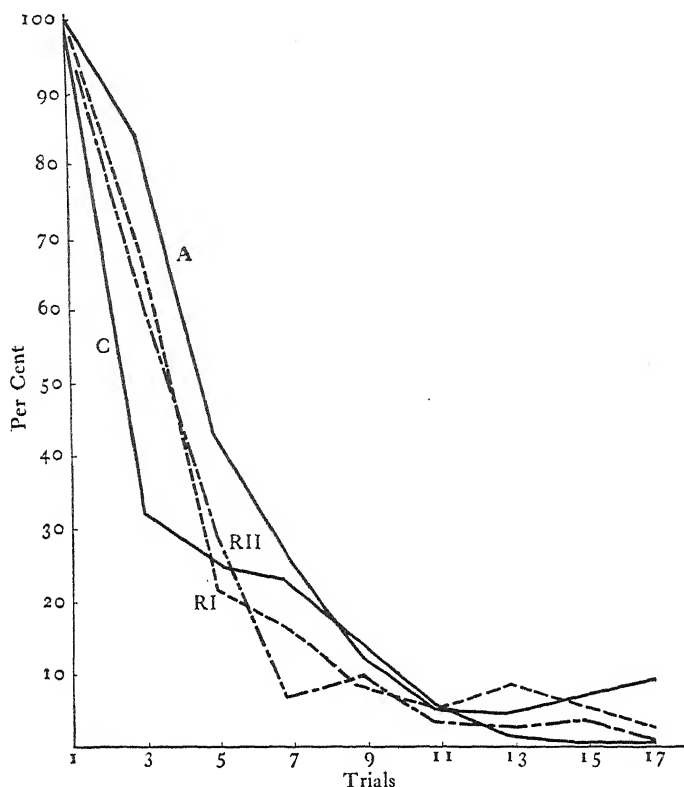


Fig. 9. PERCEPTUAL-MOTOR LEARNING CURVES OF ANIMALS, CHILDREN, AND ADULT HUMAN BEINGS

A, curve for adults; C, curve for children; RI and RII, curves for rats. These are combination curves representing in percentage terms the rate of elimination of errors, time, and unnecessary distance. (Reproduced by permission from Hicks and Carr, "Human Reactions in a Maze," *Four. Animal Behavior*, Vol. II, 1912.)

hopes of future mastery. The significance of these things is contained in the statement that the presence of a *motivating*

stimulus is essential to complex learning. The chance and simultaneous repetition of two stimuli is enough to account for the conditioning of a simple response; but in order to account for that persistence in a given type of activity which is necessary to the building up of a complex habit, we must suppose that there is some underlying situation which continues to arouse responses until the situation is significantly altered.

Taking food changes the hunger motive; the ability to climb stairs easily brings the child to its toys or its mother; the acquisition of a new curve in pitching brings to the boy a new sense of mastery. The motive may be a physiological condition such as hunger, or an acquired motive such as the hope of being a great pitcher; it may be simple or complex, unconscious or consciously formulated — but some motivating stimulus there must always be.

The presence of such a persistent stimulating situation explains the unitary character of the activity, and the fact that it keeps up until a particular thing happens which terminates the activity by removing the stimulus. In the case of young infants and animals low in the scale, the existence of abstract concepts or imagined ends, as we shall later see, would be highly improbable. But the unity and “purposiveness” commonly observed in such activity as learning to creep or learning to hold the nursing bottle while feeding, can be well understood as related to the presence of a powerful and dominant stimulus which must continue to call out relevant responses until such a series occurs as will put an end to the underlying stimulating situation.

2. *Problematic Situation.* — Intimately connected with the motivating stimulus is the second factor, the existence of a *problematic situation*. If a situation tending to arouse persistent activity in a child is soon altered or relieved by

accident or by the activity of someone else, then there is no occasion for developing a new mode of activity. Hence learning does not occur unless there is some obstacle, hindrance, or weakness which prevents that relief, allows the motivating stimulus to continue, and consequently favors the formation of a new habit in the child. The practical application of this point is evident. Parents who wish their children to acquire a large stock of useful manual habits will not only so manage things that there is strong motivation for persistent activity, but they will also refrain from removing obstacles which it is within the child's power to overcome. Mrs. Gilbreth tells of a father who would not have safety gates at the top of the stairs, but taught the children as soon as they were able to climb to come down stairs backward—under his watchful eye, of course.⁵ A little boy or girl will never learn to pound nails straight unless given a hammer and nails and materials for making things, and allowed to work freely. If the nail pounding at critical points is always done by the father, the finished product may be better looking but the child's acquisition of skill will be retarded. The child will learn effective techniques for overcoming obstacles only when those obstacles are left for him to overcome.

3. **Varied Attack.**—If we could suppose that the right response were the first one to appear, it is clear there would be no chance for learning. This would mean either that the correct act was instinctive or that the child had already encountered such a situation and learned the response, which is now reinstated. A *varied attack*, then, is an essential feature of genuine learning, and, other things being equal, the more varied the attack the greater the chance of success. The more movements the child makes, the more

⁵ GILBRETH, LILLIAN, *Living with Our Children* (Norton, 1928).

flexible the stock of habits he has acquired, the more likely he is, other things being equal, to adapt himself to a new situation, that is, the more chances there are that the right response will be among the total number elicited. After the earliest period no learning process starts at zero, as habits already acquired may begin to function at once and so abridge the varied attack. For instance, a child learning to build a tower with blocks, has already learned simple reaching and holding coördinations which give him a good start. Only in the infant's very first learning may we expect the great wealth of bodily activity which is manifested when the child begins to grasp at objects. Then too, the varied attack is often greatly abridged because some of the movements are suggested by other people. This intelligent imitation of the activity of others enters in early, along with other forms of ideational activity, to make much of the learning of the child partly ideational in character, although the child still learns chiefly "by doing."

4. **Elimination of Errors.** — Experiments with maze learning in adults have established the fact that knowledge of an error in such sensory-motor learning is not essential to its correction, and that prevention of errors either by verbal instruction or by guiding the hand is only to a small extent effective. When too much guidance is given, or it is introduced during the final stages of learning, the number of trials required to master a problem is increased, sometimes even doubled.⁶

Gates and Taylor devised an experiment to test the effect of "artificial" guidance of children in learning to write. One group practiced five minutes a day for nineteen days at tracing given letters on transparent paper. Another group practiced copying the same letters on another sheet,

⁶ CARR, HARVEY A., *Psychology*, p. 98 (Longmans, 1925).

without guidance, five minutes a day for fourteen days. In the middle and end of the training, copying tests were given. While the number of false moves during learning was very much less for the tracing group, their improvement in learning to write was slight. Although they spent even less time in practicing, the group with no guidance had made marked progress.⁷ This experiment indicates that for children as well as for adults too much guidance has a detrimental effect on learning. A certain amount of error is essential to the perfection of an act of skill. Conclusions from experiments are corroborated by everyday observations of children, so that we may regard it as established that the elimination of errors is a necessary part of the learning process. A child is not likely to form effective habits of a given type if the parent or teacher is constantly present to prevent errors, to guide and to "help."

5. Fixation. — A final factor in the process of perceptual-motor learning is the *fixation* of correct responses with the practice of the whole new activity until it functions smoothly. This fixation, occurring simultaneously with the elimination of errors, is often explained as due chiefly to the principle of frequency. According to this explanation it is the successful acts in the process of learning which are in the nature of the case most often repeated, and mere repetition strengthens an act and promotes its retention. But such an explanation can be no more than partial, for we have to explain why it is that unsuccessful acts, though frequently performed, are soon eliminated. This is a crucial point in the explanation of motor learning, and certain theories have been so prominent in child psychology that a somewhat detailed discussion of these is in order.

⁷ GATES, ARTHUR I., and TAYLOR, GRACE, "Acquisition of Motor Control in Writing by Preschool Children," *Teachers College Record*, 24: 459-469 (1923).

PRINCIPLES OF EXPLANATION

I. The Theory of Sensory Consequences. — S. J. Holmes and H. A. Carr independently suggested this principle, named by Carr, according to which a movement tends to be eliminated when its sensory consequences are such as always to lead automatically to its discontinuance. The rat reaches the end of a blind alley and *each time* withdraws. Why? Because he has learned to make a turning movement when confronted by a blank wall. The child reaches for the candle flame and before he grasps it withdraws his hand. Why? Because the heat of the flame is a stimulus for this reflex movement. In each case we see that as a result of the movement the animal is stimulated in such a way that another movement occurs.

Now we have here just the circumstances that usually result in the conditioning of a response. The baby is stimulated by the sight of the flame, then the cutaneous (pain) stimulation, followed by a withdrawing movement. After repetition the withdrawing movement is evoked by the originally inadequate visual stimulus, and thus, finally, the whole reaching movement is omitted. The rat is stimulated by a certain kinæsthetic cutaneous or visual situation as he approaches the end of the alley, then by the visual or other stimuli at the end, following which he always turns. With repetition we should expect in each case that the first stimulus would evoke the turning movement in substitution for the originally adequate stimulus encountered when the first movement is made.

Now with the gradual dropping out of unsuccessful movements, and the strengthening of the correct acts through frequent repetition, we can understand how the series of movements comes to be more and more smoothly per-

formed, until it occurs automatically as soon as the animal is in the usual situation. This objective explanation, sometimes stated as the "Law of Effect," makes intelligible the learning of complex habits by animals low in the scale and by very young children. It presupposes no complex conscious choice or ideational activity such as would be highly improbable in a white rat or a four-months-old baby (unless we accept a theory of innate ideas or a rational soul), and it avoids theoretical difficulties inherent in dualistic explanations such as that long ago advanced by Thorndike, and for years abandoned, even by its originator.

2. The Pleasure-Pain Theory. — Thorndike, in a book published about 1900, attributed the elimination of an act to the pain or displeasure aroused by it. Now it is difficult to understand how a subjective *state of mind*, following an act, could have a retroactive effect and cause the act to be omitted next time, but it is easy to see how a sensory stimulus resulting from an act may be followed by a withdrawing movement, and how later an associated stimulus could condition this movement. Besides the theoretical objection, experimental evidence makes the theory of the selective value of pain (or pleasure) untenable. In human adults who can make introspective reports it has been proved that blind alley or other errors are sometimes eliminated without even a *knowledge of their existence* on the subject's part, not to speak of definite displeasure.

But even when pain or pleasure are present, they are not to be regarded as causal entities apart from the act, which in any sense *cause* the act. Rather are they the subjective aspects of a strongly negative or strongly positive response. The act is a unit. The child does not withdraw from a hot iron *after* and as a result of the pain-sensation, but the withdrawing is immediate and of the reflex type, and *while* he

touches and withdraws, he feels pain. In general, positive responses are pleasantly toned, negative responses unpleasantly toned. The now pretty generally discredited pleasure-pain theory is thus seen to be only descriptive (of some cases) and not explanatory.

It has seemed well to emphasize the principle of sensory-motor consequences not only because it appears to be, however stated, perhaps the most important principle of explanation so far advanced; but chiefly because it is of practical importance in directing the learning of children. It has often been assumed that pleasure and pain must always be present in some form to insure learning; and so both "soft pedagogy" and corporal punishment have been justified. The preceding analysis would, however, lend little support to either of these methods of implanting desired skills. Motor learning, at least, seems to go on quite regularly without continually recurring conscious feelings — given a genuine problem, freedom to act and opportunity for using the habits acquired (fixation), a normal child may be expected to learn any sensory-motor habit that is within the range of his ability.

each of the six there was rapid learning at first and then a long irregular plateau with slow progress. There were more fluctuations in the curves for the younger children. The oldest learned most readily and retained best.⁸

Slight as is the evidence we have, it is enough to make us doubt the traditional assumption that children are much superior to adults in the ability to master motor habits such as skating, dancing, and the like. Carr has suggested that the difficulty actually experienced by adults in acquiring such accomplishments may be due not to a deterioration of ability but to lack of interest or to embarrassment, and consequent failure to enter wholeheartedly into the task. Freeman points out that the adult is sometimes helped by habits previously acquired, but sometimes, also, handicapped by the possession of long standing habits of sensory-motor adjustment which may conflict with the features of the new activity it is desired to attain.

Freeman's point finds particular illustration in the case of speech habits. An adult may be inferior to a child in learning a foreign language because he has more difficulty in inhibiting habits of pronunciation of many years standing. In general, we may conclude that while the adult probably has the ability to learn more readily than the child, the latter has an advantage over him in interest and enthusiasm, and in relative freedom from conflicting previous habits and emotional inhibitions. Hence while no adult need despair of his ability to acquire a new perceptual-motor habit, parents who wish their children to be able when they grow up to enjoy a variety of outdoor sports, and to be skillful in common manual tasks, will certainly be wise in seeing to it that they learn these things while still children.

⁸ FREELAND, GEORGE E., "A Year's Study of the Daily Learning of Six Children," *Ped. Sem.*, 28: 97-115 (1921).

2. Individual Differences. — The problem of the relation of individual differences in motor learning ability in children to such factors as sex, general intelligence and later vocational interests, is a very important one, but so far there has been little work done in this field. There is no doubt that great individual differences in ability to acquire different sorts of habits do exist. Some of the apparent tendencies which have been discovered are referred to in other parts of this book.

3. Conditions of Efficiency. — Concerning the conditions that make for efficiency in learning, we have few experiments on children alone. We should naturally expect that the same general conditions which hold for animals and adults would hold also for children. We refer to the superiority of distributed practice over massed effort and of learning by wholes rather than by parts, to the desirability of providing strong incentives, to the importance of regular conditions for learning, and the like. As time goes on it is to be hoped that these special conditions will be studied in detail in relation to different ages and different types of problem.

4. Neural Basis. — The consideration that every habit is represented in the neuro-muscular organization of the individual, is of great importance for child psychology. The traditional conception has been that particular cortical areas, and specific connections among particular neurones, are involved in the acquisition of a new mode of behavior, and in its reinstatement after a period of retention. But researches which have been going on since about 1915, under the leadership of K. S. Lashley, have demonstrated that there is no point-to-point correspondence between either native or learned responses and specific "neural pathways."⁹

⁹ FRANZ, S. I., and LASHLEY, K. S., "The Retention of Habits by the Rat

Yet although there is apparently more or less vicarious functioning of neurones in most cortical areas, and perhaps even in ascending and descending tracts of the brain stem and the spinal cord, some neurones, sensory, cortical and motor, are necessary for both acquisition and retention. Thus the functioning of a habit depends upon the retention in the physical organism of the effects of specific experience. Although we do not know the precise mechanisms involved, and they are certainly much more intricate than we have until recently supposed, the knowledge that they exist helps us to understand how it is that an act may be reinstated after long periods in which there has been neither practice nor conscious recall.

The study of the facts of behavior has shown that in a person who has not for years practiced a given act, or even thought of it, the recurrence of the old stimulating situation may reinstate it in almost the same form. A man who drinks habitually, but who has sworn off, finds himself automatically pouring out a glass of whiskey. The retired circus performer finds it difficult to keep his seat when the horses are brought out for his old act. The father of a well-known psychologist, when an old man, found some notes of an oration which he had delivered as a youth in college, and launched into the complete speech, delivered with all the gestures and dramatic emphasis that had been the fashion fifty years before. Such things are possible because learning leaves its traces in the physical organism. Whatever the child learns becomes in a certain real sense a part of him. Gradually he becomes a "bundle of habits," an organism

after Destruction of the Frontal Portion of the Cerebrum," *Psychobiology*, 1: 3-18 (1917). Lashley has followed up this work by a long series of brilliant researches reported from time to time in periodicals. For a recent statement see his article "Nervous Mechanisms in Learning," in *Foundations of Experimental Psychology*, ed. Carl Murchison, chap. xiv, pp. 524-563 (1929).

which responds unthinkingly in more or less stereotyped ways to the main features of the environment.

Despite our ignorance, then, of just what happens in the nervous system and the rest of the body when a new habit is acquired, it is important to realize that there is a definite physical basis, a basis lasting in proportion to the effectiveness with which the habit has been fixated. James long ago pointed out the practical application: "Could the young but realize how soon they will become mere walking bundles of habits, they would give more heed to their conduct while in the plastic state. We are spinning our own fates, good or evil. . . . Nothing we ever do is, in strict scientific literalness, wiped out. Of course this has its good side as well as its bad one. As we become permanent drunkards by so many separate drinks, so we become saints in the moral, and authorities and experts in the practical and scientific spheres, by so many separate acts and hours of work."¹⁰

If James had known how very early in childhood important conditionings occur, and what a wealth of complex habits is acquired even in the years before speech develops, he might have emphasized the desirability of knowledge for the old rather than for the young. It is the old who are responsible, not the young, for the establishment of the fundamental habits, they who shape the child for evil or for good as the case may be. In another respect, too, James missed the modern emphasis, when he suggested that the fates we spin are never to be undone. Such a fatalistic attitude, more recent psychological study has shown, is not scientifically justified. If learning is possible at any age, so is unlearning, which means merely acquiring a new habit in place of an old one. Given a strong enough incentive, a clearly defined problem, and a persistently varied

¹⁰ JAMES, WILLIAM, *Principles of Psychology*, Vol. I, p. 127 (Holt, 1923).

attack, a great deal may be done. Besides it is not, in the case of every habit, necessary to go through a long process of reëducation. In the chapter on the genesis and control of antisocial conduct, we shall illustrate the statement that sometimes an undesirable habit simply drops out of the total behavior picture when, because of a radical change of environment, the underlying motive which gave rise to it is no longer present.

CONCLUSIONS ABOUT PERCEPTUAL-MOTOR LEARNING

OUR knowledge of the essential features of conditioning and complex perceptual-motor learning in animals, including children, is sufficiently advanced even at the present stage of research to justify important application to the training of children. Some of the directions which such application should take may here be very briefly indicated.

In the first place it seems clear that the habits basic in civilized life should be ingrained, mechanized, made second nature, as it were, as soon as possible. This will involve the early establishment of regular habits of feeding, sleep and elimination, habits which function on a primitive conditioned-response level; of socially approved ways of walking and of communication by gesture or speech; of "good table manners" and the like; and finally of general habits of neatness, cleanliness and promptness. Such habits the child will under ordinary circumstances never need to change, but he will need to utilize them every day of his life. The more they are practiced the longer and better they will function; and when they become second nature the child will be left with desirable freedom for other more interesting activities. But if undesirable habits are allowed to get a start, it will

be very hard to break them, and they may in certain cases remain to handicap the person for the rest of his life.

On the other hand, great care should be taken not to fixate too firmly habits that may have to be changed. A child may, for example, become so accustomed to the comfortable routine of a luxurious home that he cannot adapt himself well in a summer camp in the woods, or may be utterly miserable if, owing to a change of fortune, he has to live in a "one-bathroom house." Certain "ways of living" must be kept flexible, through the avoidance of too rigid a routine, through practice of their components in a variety of situations.

A third important deduction from the treatment of learning given in this chapter is that parents should have their children learn early the particular motor skills of which they wish them to be master as adults. Thus various forms of outdoor sport, and such activities as singing and dancing, may be most naturally and effectively acquired before self-conscious adolescent years. This is not because after that age children are incapable of learning so well, but simply because they are likely to lack the time or the incentive, or to feel so awkward or so ashamed that they will not throw themselves into the process with the spontaneity which is necessary to an effectively varied attack.

Finally, the psychologist may call attention to the great importance for effective learning of seeing that certain desirable conditions exist—a strong motivating stimulus, the presence of an obstacle or problem, freedom to make mistakes, and practice under varying circumstances. These factors have been found to be essential to genuine learning, to the acquisition of habits which last and which can be utilized in later situations.

CHAPTER VII

THE ORIGINS OF MEANING IN SPEECH AND THE FIRST IDEAS

A BABY of one month responds only to a very limited range of stimuli. Things happening in the next room are entirely beyond his ken, the past is probably non-existent in his thought, the future unimagined. He has no ideas of self or of other people, no conceptions of the world, of space or time or beauty. Taken to the top of a high hill in the midst of a fertile countryside, he would see nothing of the fields and villages, or the green hills against the sky. The sound of the engines in the city below, the whirring of an aeroplane, the rush of the wind in the pine trees — none of these would have for him either value or meaning.

Yet in five years more, taken to the same hilltop, this child will look out seemingly upon the same world, exclaiming about things far and near, asking questions, scanning the sky when he hears an aeroplane, and breathing in the odor of the pine trees with delight. Years later, as a youth, he will see a still different picture. He may be then less interested in the objects themselves than in what they stand for. Not factories in the hill villages, but problems of modern industry may occupy his mind, not the number and size of the houses, but the lives and thoughts of the people living in them. The sight of the hills against

the sky may make him feel dissatisfied with his own city home and way of living; he may begin to dream and to plan out his own future.

Obviously, the same world appears very differently to different people. But for every child its meaning grows and changes with astonishing rapidity. How does the world come to take on this rich and changing significance? It would be too much to expect, ever, an entirely adequate explanation of this complex and marvelous development. The psychologist can, however, show that it is an orderly process and point out some of the factors and principles involved.

Since it is chiefly through the language used by the child that we can gauge his increasing power to identify and interpret things in his world, we must first consider the origins of meaning in speech and the first ideas. This will be the subject of the present chapter. In the two following chapters we shall deal with the further elaboration of meanings, one chapter being devoted to a discussion of the main types of meanings and their development, the other to a consideration of the organization of meanings in thinking and reasoning. Only after such a genetic treatment shall we be in a position to summarize the ways in which the child's world takes on meaning, and to point out how adults may help in making that meaning rich and adequate.

THE ORIGIN AND DEVELOPMENT OF SPEECH

Preverbal Sign Language.—Very early in infant life particular objects and situations come to call out special responses which serve as signs to adults and which, as means of communication and control, represent a primitive sort of language. Such responses may be called gestures. At

first a baby who has just learned to reach for objects may, when hungry, reach as eagerly for a talcum powder can held out before him as for his nursing bottle. Soon he will respond thus only to the bottle. The baby learns gradually to respond differentially to the various objects and persons in his immediate environment. Each, through repeated conditionings and the formation of definite habits, comes to call out a specific set of responses. Thus are objects "defined" and effective adaptive responses to them made possible.

Partial or beginning responses are soon observed to occur before the whole object is encountered. A three-months-old child may reach out his hands when he sees his rattle in front of him. A nine-months-old baby begins to smile and rock excitedly in his basket when he hears his mother's voice outside. A three-year-old boy may shrink, scowl, and cry when he sees a big dog approaching.

In such early patterns of response we may see the beginnings of the type of intelligent behavior (perception) which later on becomes important in problematic situations, as serving to characterize and define the situation preparatory to effective adjustment. These overt responses are essentially preliminary reactions involving adaptation at a distance. As such they make possible a certain measure of "control" by adults or, later, by the child.¹ A hungry baby may be kept from crying until his bottle is ready by continued talk from his mother. A timid little boy may escape the frightening presence of a dog before he is subjected to closer stimulation.

To the little child, of course, this "control" is at first unplanned and unforeseen. The act of withdrawing simply

¹ ALLPORT, FLOYD H., *Social Psychology*, chap. vii (Houghton Mifflin, 1924).

occurs as a conditioned response to the sight of a dog, based on previous experiences with the animal when loudly barking. Overt movements, which the baby learns to make in response to certain classes of objects, thus soon take on significance as signs to adults. A baby who has had enough milk turns his mouth away from the nipple. Later this sidewise turning, it is observed, occurs before the nipple touches the lips. Such conditioning affords the basis for the development of gestures. In this case the shaking of the head, associated with a refusal to take, soon means "no" to adults, and they act accordingly. Similarly, the reaching up of the hands with smiling may mean "take," and the reaching out of one hand may mean to the adult "give me."

Vocalizations also become important as signs. Certain cries, the adult soon learns, are associated with pain stimulation. Others are anger responses, as for example when the baby's movements are hampered because his sleeves have been pinned down to prevent thumb sucking. Similarly, peculiar little "shouts of joy" may begin to occur when the baby's position is changed and he is allowed to kick, or when he is put in the bath. The statement is often made that such cries, when found to be effective, are used as a means of communication and control. They do certainly perform this function, but in so far as the statement implies that the baby consciously or deliberately utilizes those cries as means to an end, we must take issue with it.

Let us take, for instance, the case of the baby said to be crying "because he wants to be picked up." A young baby, not stimulated in any way by hunger, pain, pressure of gas, muscular strain from lying in one position, or by extremes of temperature, begins to cry while lying in his crib. The nurse picks him up and pats him. He stops crying and

responds appropriately to the cuddling, but when put down he is likely to cry again, this time for an added reason. The original crying was probably a mere random reflex response to intraorganic stimuli; but now we may have also interference with an ongoing activity, an interference involving such sensory changes as are observed often to elicit responses of crying or anger. For example, if when a baby has finished his bottle, it is suddenly taken away from him, he may cry although he is no longer hungry, as proved by subsequent behavior. Taking him up again will thus only aggravate the situation.

If in the first place the baby is not taken up, the random crying soon gives way to other movements, perhaps of the hands or feet; or the baby may go to sleep. If never taken up unless for due cause the baby will establish in connection with the *usual* "lying-down-in-crib situation" only the ordinary response of playing and sleeping or, perhaps, occasional mild crying. In other words, he will not "want to be picked up," unless stimulated by pain, cold, and the like. But if often picked up when these harmful stimuli are not affecting him, the response of crying when lying in the crib will get more and more practice and will be likely often to occur when other stimuli (such as intraorganic stimuli inducing sleep) are not more compelling. Thus a vicious circle may be established, and adults may become slaves to the "desires" of a baby who is only responding reflexly to conditions which they themselves have set up. It is not until much later that the child becomes sophisticated enough consciously to use crying as a means of control.

Simple movements, then, including cries or vocalizations, early become significant in making possible communication with and "control of" adults. As gestures, they may be said to

represent the first stage in the development of language, although to the infant himself they have no symbolic meaning. The process by which sounds (and other responses) acquire such meaning is so significant in the mental development of the child that it merits detailed consideration.

As a result of recent experimental studies of conditioning and reports of close observation of infant articulation, definitely coherent and objective theories of the way in which speech develops have lately been proposed. The chief stages in this development will be discussed in connection with the interpretation of F. H. Allport.²

Stages in the Development of Speech. — 1. *Random articulation.* During the first half-year we may observe in infants the spontaneous making of simple sounds, first almost purely vowel sounds, such as *ā* and *ä* sometimes aspirated (*hā* or *ah*) or nasalized (*an*); later, especially after the third month, various vowel-consonant combinations, as *mā*, *gā*, *āng*; and finally vowels with labials and fricatives, making such sounds as *pāp*, *ūv*, and the like. These sounds apparently occur in an order determined roughly by growth of the finer laryngeal and other muscles. Of course they improve in smoothness and facility through practice. A part of the general random reflex activity of the infant, they are called out by intraorganic stimuli, and are connected with a general state of bodily well-being and organic tonicity. These speech sounds are to be contrasted with the sharper cries or noises which are definitely emotional in character.

These random infantile articulations are now being carefully studied. L. M. Malmberg, working under Gesell's direction, observed and recorded as well as he could the total vocal output of a six-months-old baby for twenty-four

² *Ibid.*, loc. cit.

hours.³ The accompanying diagram (Fig. 10) shows the character of the vocalization. Out of such material are the words of adult speech gradually fashioned.

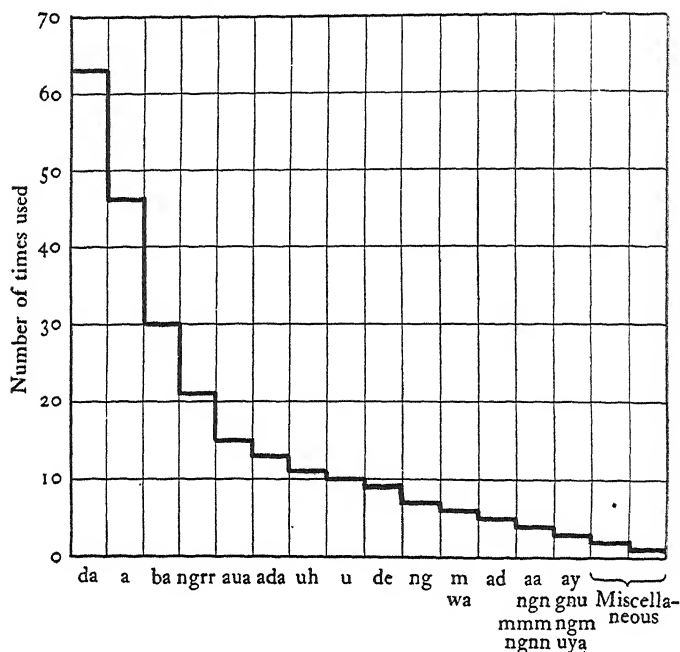


Fig. 10. VOCALIZATIONS OF A SIX-MONTHS-OLD CHILD DURING TWENTY-FOUR HOURS

Sixty-four different sounds were distinguished. (From Gesell, *Mental Growth of the Preschool Child*. Reprinted by permission of The Macmillan Company, Publishers.)

2. *The babbling stage, with the fixation of circular responses.* "The chief significance of the vocal play of babies," says Allport, "seems to be in establishing circular reflexes between the sound of the syllable and the response of speak-

³ GESELL, ARNOLD, *Mental Growth of the Preschool Child*, pp. 213, 216, 217 (Macmillan, 1926).

ing it." When the baby articulates a given syllable, for example "da," he is being stimulated by two main groups of stimuli, one the auditory group represented by "da," the other a kinæsthetic-tactual group arising from the responses of the laryngeal, throat, and tongue movements which occur as the word is said. Now with a few chance repetitions of the sound, we have the essentials for the formation of a conditioned response, namely two stimuli affecting the organism at the same time and followed by a common response, the speaking of another "da." On the basis of our knowledge of facts about conditioned responses, we should expect the sound of "da" alone finally to become an adequate stimulus for the response, and hence should expect that later when another person says "da," the child would tend to repeat it. The playful repetition of sounds, "da, da, da," "ma, ma, ma," "ji, ji, ji," and the like, is a characteristic feature of the infant's vocal activity, especially in the last part of the first year. Thus during that year he not only acquires a great deal of practice, through random articulation, in the chief elements of his future speech; but he also by his babbling establishes the conditions which make it possible for him later to imitate the speech of others.

3. *Evoking of the articulate elements by the speech of others.* The infant having been so conditioned by his spontaneous "practice" that the auditory stimulus of a sound alone is sufficient to produce the response of making the sound, the next step is clear—that is the evoking of the sound by the auditory stimulus *given by others*. Here we have an ordinary conditioned response, and when a child says "da" after an adult, he is showing the effect of specific learning or conditioning. By repeating to the child other sounds which he has already spontaneously practiced, adults may evoke the sounds again and again and thus lead to

facility in their use. No sound, however, will be thus repeated which the child has not already used. This consideration explains the great difficulty parents report in getting their children to imitate particular sounds. If there were an innate "instinct" to imitate, such lack of success would be hard to understand, but on the basis of the present theory it is easily explained.

4. *Conditioning of the articulations by objects and situations.* Let us suppose that on the evening of the day on which the mother has first got the baby to say "da" and "da-da-da" after her, the father comes into the nursery. The baby smiles and begins to move his arms up and down while looking at his father, while the mother says "da-da." The baby repeats it. This is the beginning of frequent practice in which the sight of the father, the sound of his voice, or the whole complex stimulating situation, is connected with the response "da" or a variant. Practice of the two-syllable form "da-da" is encouraged by adults, while that of the one-syllable form is regularly interfered with. After some time the baby says "da-da" as soon as he sees his father.

Thus the first naming habits originate. At first they are uncertain and "mistakes" are very common. "Da" may chance to become associated with the bottle rather than the father, and the usage may persist for a long time, especially if it is encouraged by adults. Or "da-da" may be a name given to all persons or to all men, or to all dark men with beards, according to the nature of the practice and the amount of detail in the stimulus-pattern to which the baby has learned to react. Again, a chance utterance of the child may be connected with any familiar object, and, if its use is encouraged by adults, become the name of that object. For example, the writer's little nephew one day kept repeat-

ing "du du" as if in entreaty. When his mother gave him a drink he was satisfied, and she, concluding that by "du" he "meant" water, always called water "du" after that, and so the word was for a long time a part of his vocabulary.

In a similar way random articulations may become attached to situations, such as a man coming or a dog barking; and thus verbs are acquired. The process of the acquisition of adverbs and other parts of speech and later of grammatical inflections we shall expect to go on in the same general way.⁴ It must not be supposed that in the early development of speech all words are acquired separately and then combined in sentences. On the contrary we find commonly that whole sentences are learned at once, in connection with a complex situation; and the differentiation of this "sentence-word" into words referring to parts or aspects of the situation comes only after much experience. Conversely we have the "word-sentence." For example, the word "Bread" may mean "Give me some bread" or "I want bread." Hence there is a question as to the value of attempting to classify the words used by young children as "parts of speech."

According to this theory adults should not expect children instinctively to imitate their speech. They must wait until a sound similar to a common English sound or word occurs in the infant's "talk" and then take advantage of this to encourage practice. At best the first words will be crude approximations to adult speech, but once the most common elementary English (or French or Chinese) syllables are acquired, progress will be rapid.

⁴ Analyses and examples are given in STERN, C. and W., *Monographien über die seelische Entwicklung des Kindes*, I and II (Barth, 1922); also STERN, W., *Psychology of Early Childhood*, chap. x (Holt, 1924).

Disorders of Speech. — Since speech habits practiced early and for long may be retained indefinitely, it is clearly important that those around the child shall strive early for clear articulation and correct pronunciation. Speech surveys in public schools (by Wallin, Smiley Blanton, Conradi and Stinchfield) have shown that from two and one-half to nineteen per cent of the pupils suffered from speech defects, lisping and stuttering being especially common. Among two hundred and seventy-six school children examined by Dr. Sara M. Stinchfield, nineteen per cent were found to be in need of training for mild or serious speech defects.⁵ Such defects have usually been found to be due, not to the structure of the speech organs, but to the acquisition of faulty habits of articulation. Sometimes infantile speech habits persist because encouraged by parents. One freshman at a leading women's college was assigned to a speech correction class because of lisping, but her parents objected strenuously, saying that she had lisped since babyhood, and the lisping was part of her charm. Not until she was a junior did the girl recognize the defect as a social handicap and ask the college authorities for help. All in all, it seems very clear that the common warning against baby talk is more than justified.

Many cases of hesitancy in speech, as well as stuttering, stammering, and the like, seem to be of "nervous" origin, that is, to be part of a general maladjustment involving a sense of inferiority.⁶ The psychological basis of such speech

⁵ These investigations are summarized in STINCHFIELD, S. M., *Speech Pathology with Methods in Speech Correction*, p. 85 (Expression, 1928). This book includes an excellent treatment of practical means of dealing with speech difficulties. For a more detailed description of the surveys, see also Dr. Stinchfield's monograph "The Formulation and Standardization of a Series of Graded Speech Tests," *Psychol. Mon.*, No. 149, 1923.

⁶ BLANTON, SMILEY and MARGARET G., *Speech Training for Children* (Century, 1919), and chap. viii in *Child Guidance*, by the same authors (Century,

defects is indicated by the fact that in a given individual the stuttering may appear in times of stress or self-consciousness, but while the person is absorbed in work or relaxed at home, his speech may be entirely free from the defect. One intelligent woman who stutters so badly that it is difficult for her to carry on an ordinary conversation, is an excellent actress and when on the stage plays a difficult rôle with long speeches, with no sign of hesitation or stuttering.

Psychologists have evolved tests for some speech functions, studied methods of speech training, and elaborated the psychological and other problems involved. The increasing recognition of the importance of the subject is attested by the fact that separate departments of speech have been established in certain leading universities in this country. Perhaps the most valuable series of graded speech tests is the one formulated and standardized by Dr. Stinchfield at the University of Iowa.⁷ The series includes tests for articulation, spontaneous speech, oral and silent reading, and vocabulary. These have been found very valuable in the objective diagnosis and analysis of speech difficulties.

Development of Vocabulary. — The existence of a large number of excellent vocabulary studies makes it possible objectively to gauge the rapidity of growth in vocabulary from year to year as well as to estimate the importance for growth in vocabulary of such factors as intelligence, sex and social status.

Records of the growth in vocabulary of individual children have been common since the very beginning of the child study movement. Among well known early studies

1927). See also FLETCHER, JOHN M., *The Problem of Stuttering, a Diagnosis and a Plan of Treatment* (Longmans, 1928).

⁷ STINCHFIELD, SARA M., *The Formulation and Standardization of a Series of Graded Speech Tests*. See also the same author's *The Psychology of Speech*, chap. xii, "Speech Measurement" (Expression, 1928).

are those of Preyer, Moore, Shinn, and Major. Among later reports of vocabularies at different ages are those by Bate-man, Brandenburg, Pelsma, Mr. and Mrs. G. M. Whipple, and the important German studies by Clara and William Stern.⁸ In making these studies various methods were used. In general, continuous records of words used were made only for years under three. Vocabulary at later ages was estimated by counting all words used during a given time, for instance during one day, or by giving vocabulary tests. Some counted all grammatical variants while others did not, and in other respects, also, the standards and methods varied.

In recent years standard vocabulary tests have been worked out and applied to groups of children. In France Alice Descoedres has devised elaborate "Tests of Language" by which may be obtained fairly accurately a child's vocabulary at various ages. Her tests have proved significant also as intelligence tests. In this country vocabulary tests have been developed by Kirkpatrick, Starch, Terman, and others.

The most important experimental investigation of the vocabulary of groups of children so far published is that of Madorah E. Smith, made at the University of Iowa and published in 1925.⁹ Miss Smith constructed a list of two hundred and three words in common use by young children, using as a basis every twentieth word in a list from Thorndike's *The Teacher's Word Book*. Then by tests and questions she determined the number of words known, and computed a child's total vocabulary by multiplying the number known by twenty. Many objects and pictures were used to

⁸ WADDLE, C. W., *Introduction to Child Psychology*, chap. viii (Houghton Mifflin, 1918), gives a summary of the chief studies in vocabulary which had been reported up to 1918.

⁹ SMITH, MADORAH E., "An Investigation of the Development of the Sentence and the Extent of Vocabulary in Young Children," *Univ. of Iowa Stud.*, 1926, 3, No. 5.

elicit use of the test words, and where these could not be used, standard questions were employed. This method of testing vocabulary was proved to have a high degree of reliability, by comparison with seventy-seven published actual vocabularies, by checking with mothers' observations in three cases, and by correlating with the Descoeudres tests and Cobb's rearrangement of the Terman vocabulary test in the Binet scale.

Smith applied her test to two hundred and seventy-three children of Iowa City, taking at least thirteen children for each half-year group from eight months to five and one-half years, and nine children six years of age. The results, plotted in Fig. 11, show an extremely rapid but steady increase in vocabulary up to six years. After the age of six the rate of acquisition of words is not so rapid, since the child, now having a fair working vocabulary, has not the same motive for acquiring new words.

Through statistical treatment of her results Miss Smith sought to find out what light they threw on certain factors involved in the increase in vocabulary. Contrary to common opinion and to the results of studies of very small groups, her results showed no significant difference between boys and girls. Nor did she find that social status seemed an important factor. When twenty-two pairs of children of the same mental and chronological ages from the University School and Day School groups were compared, no valid differences in vocabulary were found. The university group, representing a higher social status, might have been expected greatly to excel the other group. Descoeudres, not eliminating differences of intelligence, had found great superiority in vocabulary among children of higher social status. These results do not necessarily, however, show that social status does *not* influence size of vocabulary, when

intelligence is constant, for the verbal nature of the (Stanford) tests may prevent them from being a fair test of native intelligence. That there is a close relation between

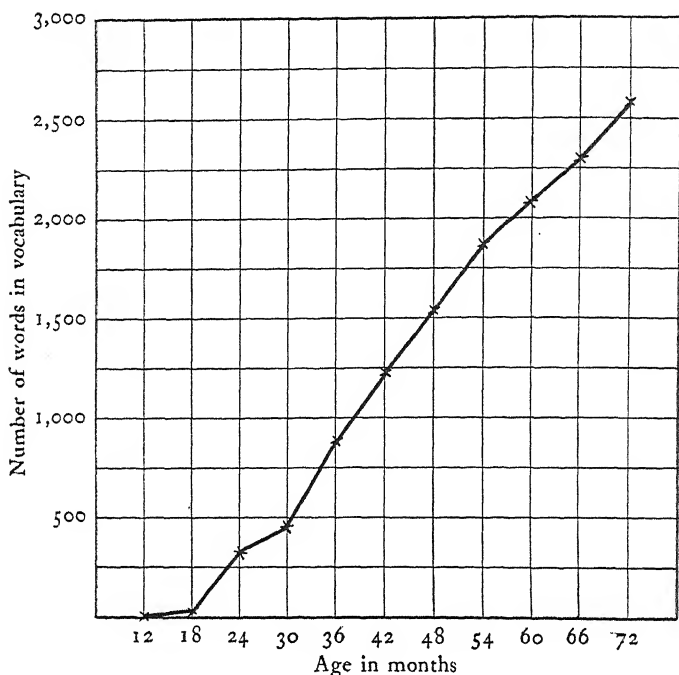


Fig. 11. AVERAGE SIZE OF VOCABULARIES OF CHILDREN FROM ONE TO SIX YEARS

The curve is based on records from two hundred and seventy-three children, forty-three children being tested more than once. From "An Investigation of the Extent of Vocabulary in Young Children," by Madorah E. Smith. (*Univ. of Iowa Stud. in Child Welfare*, Vol. III, No. 5, 1926. Used by permission.)

intelligence as measured by verbal tests and extent of vocabulary is well known, and is illustrated by the high correlation of $+.69$ which Smith found between mental age and vocabulary when chronological age was kept constant.

If groups from the two social classes, of equal intelligence as measured by non-language tests, had been given the vocabulary tests, it might have been found that those of the higher social class would excel in extent of vocabulary.

Smith presents data on twenty-two pairs of children each pair of about the same mental and chronological age, but one a first-born, the other a later-born child. The average vocabulary of the first-born was 1,738 words, that of the later-born, 1,774. These findings do not bear out the popular opinion, and findings by scattered observers of a few children, that the younger children of a family have an advantage over the older ones in learning to talk.

THE ORIGIN AND NATURE OF IDEAS

UP to this point, in theory, the speech which we have discussed has been definitely on a perceptual level, that is, it has consisted of responses to things seen, heard, "felt," tasted or smelled. Such speech responses Allport calls "naming habits," and he points out that these pass over gradually into "demanding habits." A child, having acquired the habit of applying a particular name to any object, for example, "da" for "doll," says "da" one day while looking at a doll out of reach. "He wants it," says mother, and proceeds to hand the doll to him. This being repeated, a connection is formed between the stimulus situation "sitting-and-fixating-on-doll" and the naming of the object. If the mother did not repeatedly present the doll, the act of naming it while in the looking-and-reaching situation would not be likely to be often repeated, since the child would soon respond to other more potent stimuli. Hence the baby in time develops the habit of "asking for" things which he sees or hears.

The First Ideas.—In the course of this perceptual development a very important transition is early made, that is, the transition to speech referring to *objects or situations not present*. Just when this habit of symbolic reference begins we cannot ascertain, largely because of inability to get an introspective report from the baby. But we have an objective indication of its presence in the occurrence of words consistently used in the absence of particular objects. How can this non-perceptual demanding be explained?

Allport explains the first demanding which occurs in the absence of the object as a response conditioned by practice in demanding when the object was present. In the course of that practice the response "da," evoked by the sight of the doll, would naturally become associated with the whole sitting-reaching-and-playing situation. Therefore after a time the response would occur in the absence of the object.

At first, presumably, the naming response as a mere conditioned reflex does not involve thought of the absent object; but we must suppose that at some point in the development the baby not only names the object but *thinks* it without naming it. Or the pronunciation is accompanied by the thought. That there must early be such implicit symbolic reference is suggested by the behavior of the child who, when the correct object is presented, receives it and plays happily; but who if a different object is presented, shakes his head and will have none of it. In the former case one may assume that the object brought is a stimulus fitting in with the complex inner and outer stimulus-pattern which is affecting the child, and that there is therefore an unimpeded and even accelerated continuation of the series of responses already in progress. But if an object not thought of is presented, it will awaken responses not already or incipiently in progress, and hence as tending to break up ongoing

activity, will arouse general negative responses, or even anger.

Having acquired the tendency to say "da" or think "da" when in certain bodily and general play situations, the baby is likely when in such situations to speak the word. If frequently, when he does, the doll is brought to him, this habit (of sitting in a certain place, speaking the word "da," and starting to play with it) is strengthened. Finally through practice the speaking of the word "da" becomes the natural response to the situation of sitting and "thinking" of it. At this stage we have the beginnings of that type of mental activity which we ordinarily call wishing or desiring. This involves a conscious thought response standing for an absent object, a response which tends to initiate in incipient form the reaching or approaching responses which would naturally be made to the actual object if it were present. The baby may be said to want or desire an object when in its absence he *thinks* it and tends to respond to that thought with associated incipient reaching movements or by naming the object. Such wishing must of course be very rudimentary, lacking the rich context of ideas, which later are likely to form a part of any desire.¹⁰

Is Thought Implicit Speech? — We have spoken of an object as represented in its absence by a spoken word or by a "thought." Just what is a thought? One theory, which fits in well with the discussion so far, is that thought is inner speech. According to Watson, a word becomes a thought when, although it is not spoken aloud or even whispered, it is uttered implicitly so that others cannot observe it. It is easy to trace a transition from overt speech to such implicit "articulation." At first a baby says everything "right out loud." No one objects and there are no obstacles to such

¹⁰ See the chapter on "Why Children Learn."

behavior. Soon, however, he is told not to make so much noise, is taught not to speak when others are speaking, or is laughed at by older children when he "talks to himself." Children are often observed to carry on their playful talk in a low voice or in a whisper. Even that being frowned upon, what more natural than that the baby should cease the overt talk in certain situations, only the implicit part of the movement-pattern remaining to represent the object?

Such short-circuiting, Watson points out, is a common feature of mental activity. We saw that in typical sensory-motor learning unnecessary movements tend to drop out, leaving only the essential series. We observe that in the process of ordinary conversation a person's name, if long, comes to be more and more abbreviated. Alexander is referred to as Alex, and to the initiated, Andy or Al is just as significant. The word "and" is at first written out in a schoolboy hand, then the flourishes disappear, and finally for many people only a little curlicue is left. As long as the sign can still call out appropriate behavior it is serviceable. The process of subvocal short-circuiting may be essentially the same. As long as there is any consistent remnant left of the original series of implicit and overt acts making up the word, that remnant, be it only a slight contraction of certain obscure muscles in the larynx or other part of the body, may still be the symbol of the object to which the whole word was originally a response. Thinking, then, Watson believes, may be carried on as a series of such responses, linked together in accordance with the ordinary principles of habit formation.¹¹

It seems entirely reasonable to suppose that much thinking may go on in terms of implicit speech, in which the

¹¹ WATSON, J. B., *Psychology from the Standpoint of a Behaviorist*, chap. ix (Lippincott, 1919).

separate subvocal responses serve as symbols for objects or situations not present. It does not seem probable, however, that such verbal responses could be the only symbolic processes. J. B. Watson, who first set forth and strongly defended the theory of thought as implicit speech, himself saw that sometimes other symbols could function in the same capacity.¹² If thought were merely internal speech, then obviously no animals could have ideas, nor could children before learning to speak. Now experiments indicate that there is a certain amount of simple symbolic behavior in some animals; and not only common observation but experimental work also suggests that children too young to speak can employ ideas.

Before considering this evidence, it is desirable to ask what we mean by a thought or idea. Following provisionally the analysis given by Hunter in "The Delayed Reaction" we may say that an idea is a representative process standing for some absent object or situation; or with Carr that an idea is "some present process or item of experience considered in its symbolic or representative capacity."¹³

Young children long before learning to speak are observed to act in ways which very strongly suggest that they have ideas of things not present. For example, the Scupins report this behavior on the part of their one-year-old son, who had taken a favorite celluloid goldfish out with him for his airing. "We noticed that the child all at once became restless; he moved uneasily back and forth, and at last turned right round and kept staring over the back of his carriage onto the sidewalk. Then he uttered impatient

¹² This is shown even in the book referred to above, where he says "Thoughts are couched in words or their equivalents." The importance of the nonverbal symbols is more clearly recognized in his *Behaviorism*, chap. xi (People's Institute, 1924).

¹³ HUNTER, W. S., "The Delayed Reaction," *Behavior Monograph*, No. 6 (1912); CARR, H. A., *Psychology*, p. 169 (Longmans, 1925).

cries and looked at us with entreaty. It turned out that the goldfish was missing, and the nursemaid found it lying on the walk a hundred steps back. The child had thrown it down but wanted it again, and was trying to call our attention to his loss."¹⁴ Similar incidents are often reported of children who have not yet learned to speak. Suggestive and convincing as such observations are, we can not be sure, in the absence of experimental control, that essential factors are not overlooked, and that the behavior could not be interpreted as response to present stimulation.

Experiments on Ideas in Animals and Children.—Experiments on monkeys and apes by Haggerty, Yerkes, Hamilton, and others, strongly suggest that, as our theories of evolution lead us to expect, these animals sometimes utilize ideas.¹⁵ The methods employed, however, have not been sufficiently controlled to enable us to say definitely that they do. Experimental study of apes by Köhler, in the years since 1917, lends support to the conclusions of Yerkes and others, but stimulating as this work is, it suffers even more than the above mentioned investigations from lack of rigid control and complete and exact description.¹⁶

The most conclusive work on animals was done by Hunter, in a well-known investigation of "The Delayed Reaction in Animals and Children."¹⁷ In this experiment, conditions were so arranged that the animals could get food only by

¹⁴ SCUPIN, ERNST UND GERTRUD, *Bubi im ersten bis dritten Lebensjahre*, p. 52 (Grieben, 1907).

¹⁵ HAGGERTY, M. E., "Imitation in Monkeys," *Jour. Comp. Neurol. Psychol.*, 19: 337 (1909); HAMILTON, G. V., "Perseverance Reactions in Primates and Rodents," *Behavior Mon.*, 3, No. 2 (1916). YERKES, R. M., *Almost Human* (Century, 1925), is a very interesting popular account of the behavior of certain apes.

¹⁶ KÖHLER, W., *The Mentality of Apes* (Harcourt, Brace, 1927).

¹⁷ HUNTER, W. S., *op. cit.* Every advanced student of psychology should study the original monograph carefully, not only for the results but especially as an example of carefully controlled and exact experimental work.

going to one of three boxes in which a light appeared. After they had learned always to go to the lighted box, they were restrained at each trial for a varying period after the light was turned off, and thus could go to the right box only if they retained some clue to its position during the delay. Hunter found that the rats, cats, and dogs could go to the right box after delay only if they maintained a definite bodily orientation during the interval. A dog, for example, might, after the light in the box went off, remain lying during the delay with his nose pointed toward the box, and when released would follow his nose. This type of response is clearly a reaction to a present postural (kinæsthetic) stimulus.

The raccoons, however, in a significant percentage of trials reacted correctly after delay *even when they did not maintain any type of bodily orientation*. Assuming that all other external sensory clues were excluded, as we may, considering the excellent experimental control employed, the conclusion is plain that the animals must have utilized some implicit (intraorganic) cue, which stood for or symbolized the lighted box. In other words, they used "ideas." A particular implicit response originally made to the lighted box must have been reinstated after delay when the animal was again in position facing the boxes, and this intraorganic response must have furnished the stimulus to the correct movement. If in this way the positional stimulus involved in again facing the boxes elicited this intraorganic response we must assume that the inner response was fixated at the time of exposure to the light, and that the neuro-muscular conditions necessary for its retention during delay existed as for any other "habit." Notice that nothing need be assumed as to the precise nature of this hypothetical intraorganic response. It might be muscular, glandular, or even

purely intraneural, simple or complex, conscious or unconscious, accompanied or not accompanied by some sensory image of the lighted box.

In the same experiment with a modified type of apparatus, all of the five children tested reacted correctly in a significant percentage of trials, the percentage of correct responses rising with age. Since the youngest child was two and one-half years old, we could explain its behavior as due to the use of either overt or implicit speech. This explanation would not hold for animals, but it might be maintained that experiments on animals are inconclusive. Hunter's are by far the best controlled of those performed, but of course his is only one experiment, and there is a possibility that some source of error was overlooked.

A further experiment by Hunter on "The Delayed Reaction in a Child"¹⁸ is therefore of particular interest, since his subject, a little girl thirteen to sixteen months of age, had no *vocal language*. The approximately half dozen words she used occurred only in response to definite sensory stimuli, and experimentation was stopped after three months, before the first signs of symbolic language appeared. This child, Hunter's daughter Thayer, was seated before an apparatus similar to that used for the animals in the preceding experiment. (Cf. illustration, Fig. 12.) A favorite toy was placed in her hand and as she was responding to it with interest Hunter took it from her and placed it in one of the boxes. After she had leaned over or been pushed over and looked in, the lid was closed, and the baby was thoroughly distracted by carefully planned "play" during the interval of delay. About two seconds before the end of the delay period Thayer's body was straightened around

¹⁸HUNTER, W. S., "The Delayed Reaction in a Child," *Psychol. Rev.*, 24: pp. 74-87 (1917).

and she sat facing the apparatus. In all but a few cases in two hundred and eighty-four trials, she began to hunt for the stimulus as soon as she was in position.

The results of this experiment seem conclusive. From the first Thayer reacted correctly after a delay of as long as at least ten seconds, and by the end of the experimenting had mastered the

twenty-four-second interval. It is possible that these successes were due to cues unconsciously given the child by Hunter, since he held her at the moment of release. If that were the case, however, it would be hard to understand why there were so

many errors, and why the subject was unable to delay longer than a definite number of seconds. On the whole, the conclusion seems justified that the child was reacting on the basis of the retention of a "memory-idea" of the position of the box.

Miss Jeannette McClure, working under the author's direction with both a two-box and a three-box apparatus, has obtained similar positive results from several infants.¹⁹ Figure 12 shows the three-box apparatus, like Hunter's except for the sloping top which makes it easier for small babies to reach in.

Since not only careful observation but convincing experi-

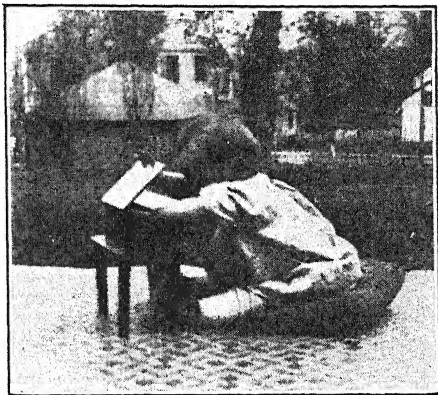


Fig. 12. NANCY ALICE CHOOSES THE LEFT BOX

¹⁹ MCCLURE, JEANNETTE, *A Critical Survey of Measures of Intelligence in Preschool Children*, unpublished Master's thesis in the library of Smith College.

ments indicate the use of ideas by some animals and by children too undeveloped mentally to use words symbolically, it is clear that other than verbal symbols must be important in thinking. The "present process or item of experience" which stands for the absent object may reasonably be thought of as a definite response of some kind, a response either of a striped or smooth muscle or of a gland. It might even be a purely neural process, although there are good reasons for objecting to such an assumption.²⁰ In adults the response is very likely to be subvocal, that is, a response in some of the internal laryngeal muscles which was originally a part of the spoken verbal response, but is not now complete enough to produce a sound. In little children who do not talk, and in animals when they utilize ideas, the symbolic response must be non-verbal. It might consist of an overt or an inner "gesture," of a motor set or bodily attitude, of some change in glandular secretion, of a visceral "stress" or a kinæsthetic "strain" somewhere in the organism.²¹

In the delayed reaction in the infant, we must suppose that at the time of first seeing the toy placed in one of the boxes, some definite response of one of these types was made, a response associated at that time with incipient reaching movements toward the box, and visual as well as bodily orientation toward it. The response is thus associated with the general situation in much the same way that a new word may be in an older child. Just as a new word may be learned on one occasion, so may this non-verbal symbolic

²⁰ For theoretial discussions of the motor theories of consciousness see LASHLEY, K. S., "The Behavioristic Interpretation of Consciousness," *Psychol. Rev.*, 30: 237-272, 329-353 (1923); HUNTER, "The Symbolic Process," *Psychol. Rev.*, 31: 478-497; HOLT, E. B., *The Freudian Wish*, pp. 153-208.

²¹ For a clear treatment of the possibilities in the way of symbolic responses in thought, see HOLLINGWORTH, H. L., *Psychology—Its Facts and Principles*, pp. 309-313 (Appleton, 1928).

response be fixated while the toy is being put in the box. And just as the new word may be retained and recur in a similar situation later, so may this hypothetical response "X" recur later on. Although during the delay the response is not functioning, when the child is again in position and free from distraction the newly learned response will tend to recur. And when it does, it tends to elicit the bodily turning and the reaching movements with which it became associated just before the delay. Thus the correct box may be "chosen."

When we ask how ideas can be described introspectively, we encounter serious difficulties, especially as far as animals and young children are concerned. Reports of adults indicate that thoughts of a specific object are often accompanied by vivid sensory images of the object. Thus as a man thinks of the snow-capped mountain he climbed one time, he may shut his eyes and see a visual picture of it almost as clear as the original; or he may feel the cold of the staff he grasped, or smell the odor of the coffee he drank on returning. The images have a definite sensory character, with objective reference—the gleaming whiteness of the snow is actually seen, not merely thought about. Perhaps only a part of a scene recalled is imaged, for instance a particular slope of the mountain against the sky, while the rest, though it can be described in words, is not actually "imaged." Similarly, the cold may be actually felt, and the coffee actually smelled. The sensory images involved are to be carefully distinguished from the incipient shivering or sniffing movements which may be elicited in the recall. Failure to make such distinctions is an important source of error in investigations of imagery.

Studies of imagery in adult subjects who have been carefully trained in making reports, indicate that sensory images

are indeed often present during recall or in general thinking. It seems that a great deal of thinking, however, goes on with little or no imagery. The subject may be aware of sensations from movements of the throat or lips, indicating that "internal speech" is present, or of various shifting bodily strains, stresses, and gestures, but he is unable to relate these, usually, to definite thoughts.

There is good reason to suppose that a great deal of our thinking goes on, indeed, at an unconscious level, being "carried forward" on the basis of almost automatic intra-organic symbolic responses. Evidence for this view is based not only on a consideration of introspective reports from experimental "thinkers," but also on other considerations. The extreme rapidity of thought would not seem to allow time for the characteristically rather slow formation of definite images. Then, too, there are the records of problem-solving during sleep, and the frequent cases in waking individuals in which the solutions of problems suddenly "pop up from nowhere," to the surprise of the thinker. Finally, there is the evidence from clinical and general personality study that decisions which appear to the maker to be fully rational, are often, indeed usually, based in part upon unconscious thought-mechanisms of the existence of which the subject is entirely ignorant.

But while images are apparently unnecessary for thinking, and certainly do not occur independently, as they are always based upon neural and motor processes, there is some evidence that the total situations of which they are aspects are, at times, of value in adjustment. Various investigators have concluded that images are likely to arise when there is some hitch or difficulty in recall or thinking, and that under such circumstances the subject, by striving to make the image clear, is sometimes able better to orient himself with respect

to a concrete situation. Sometimes too, it seems, abstract thinking is hindered by the intrusion of a definite image.

The general conclusion is that individuals differ greatly in the extent to which their thinking is likely to be characterized by images. For most people, however, it seems there is a tendency for images to appear under two circumstances: at points where there is some difficulty or conflict in thinking, and at points where there is an effort to recall a definite perceptual situation.²² Fernald did not find clear evidence that imagery either is or is not likely to be helpful in the first type of situation.²³ It is suggested that in the second, imagery may serve an important function. For one thing it may increase for the subject the richness of his recall of a situation. He may take pleasure in contemplating vivid images as he once did in observing the concrete situation. Then too, if the situation to be recalled involves important memories, the effort to construct an image may be an aid in the desirable reinstatement.

This second function of imagery suggests that it may be particularly prevalent, and particularly important, in childhood. While the abstract thinking demanded of adults would be hindered by the presence of a good deal of concrete imagery, the child, whose chief task at first is to become acquainted with the surrounding world, may perhaps be aided in his knowledge of and appreciation of that world by concrete imagery.²⁴

The theory that there is more concrete and more vivid imagery in children than in adults, has long been urged. It has often been assumed, also, that the thinking of primi-

²² BETTS, G. H., "The Distribution and Functions of Mental Imagery," *Teachers College Contributions to Education*, No. 26 (1909).

²³ FERNALD, MABEL R., "The Diagnosis of Mental Imagery," *Psychol. Mon.*, 14, No. 1, whole No. 58 (1912).

²⁴ ALLPORT, G. W., "Eidetic Imagery," *Brit. Jour. Psychol.*, 15: 99-120 (1925).

tive peoples and of little educated civilized adults is similarly rich in imagery. There is some experimental support for this theory as far as concerns children and adults of little education. In certain investigations these have reported a wealth of imagery as compared with older and better educated subjects.²⁵ This evidence is, however, not really reliable, for untrained subjects generally tend to report vivid imagery, whenever they recall anything vividly, no matter in what terms the recall proceeds. They have not learned to distinguish between "having a vivid sensory image of an object," and "thinking clearly about the sensory qualities of the object." It may be that the results are due simply to the fact that the older and better educated subjects are giving more accurate reports.

Further evidence on the prevalence of imagery in childhood has recently been brought forward by German investigators. Psychologists in general, recognizing the extreme difficulty of getting reliable reports on imagery even from specially trained adults, had lost interest in the subject, when it was again stimulated in many quarters by reports of the investigations of Jaensch and his followers. They announced the "discovery" that some individuals have visual images of hallucinatory clearness, so stable and objective in reference as to be qualitatively different from the ordinary visual memory image. These "eidetic images" they found to be more frequent among children than adults, with the "height of the gift" fixed at twelve to fourteen years, and a marked decline during adolescent years. The power to produce such images, they thought, varies not only with age, but with physiological factors such as rate of metabolism, with temperament, with stage of racial development,

²⁵ GALTON, SIR FRANCIS, *Inquiries into Human Faculty and Its Development*, pp. 99-100 (Macmillan, 1883).

with nationality, and probably with other factors such as sex and intelligence. Upon their investigations they based an elaborate evolutionary theory of mental development and of personality types.²⁶

The general method of study used by the German workers is to exhibit pictures, diagrams and objects to the subjects, under various conditions, and then to have them look at a neutral background, reporting what they see. Using complex colored pictures as stimuli, Gordon W. Allport, working in England, did find that fifty per cent of his eleven-year-old Cambridge school children were able to produce such vivid images as the Germans described.²⁷ Heinrich Klüver, using the German methods, studied in California fifteen adults and twelve children, who had been selected by preliminary sorting tests as possibly having the gift. He reported that the results showed unusual power of imagery for certain subjects, but found no great difference between children and adults. In later investigations, very carefully controlled, he discovered no significant differences in eidetic endowment between colored and white people, but found vivid imagery to be much more common in children than in adults.²⁸

The experimental data on eidetic imagery may be interpreted in various ways. Allport in a recent paper presents arguments to show that in some cases what Jaensch and his followers called eidetic images must have been in reality ordinary visual after-images; and that in other cases the images were simply unusually vivid memory images.²⁹ But

²⁶ JAENSCH, E. R., *Die Eidetik* (1927); also "Über Eidetik und die Typologische Forschungsmethode," *Zsch. f. Psychol.*, 102: 35-56 (1927).

²⁷ ALLPORT, G. W., *op. cit.*, p. 101, footnote.

²⁸ KLÜVER, HEINRICH, "A Study of the Eidetic Type," *Genetic Psychol. Mon.*, 1:183, 219-223; also the same author's "Studies on the Eidetic Type and on Eidetic Imagery," *Psychol. Bulletin*, 25: 69-104 (1928).

²⁹ ALLPORT, G. W., "The Eidetic Image and the After-Image," *Amer. Jour. Psychol.*, 40: 418-425 (1928).

the investigations of Klüver and others, including Allport, have shown that unusually vivid images which are not after-images, are present in some subjects; and this fact is significant whether we call the images eidetic, or speak of them as memory images.

Meanwhile we may continue to gather data on children's thinking through the study of their speech or their written language, of their drawings, their constructions in play, and their general varied behavior in problematic situations. It is chiefly through the study of this objective material, the writer believes, that we shall increasingly gain a useful understanding of childish thought. It would be of interest to know also what conscious processes, such as sensations or images, accompany the thinking which we are studying. But such a knowledge would, it seems to the writer, aid little in understanding why children think. It would enable us merely to add descriptions of subjective states to our objective formulations; and such addition would serve merely as minor supplementation of the main treatment. The backward state of the study of imagery need not, therefore, discourage the student of child psychology. The discussion of this whole topic will have illustrated for the student some of the difficulties and weaknesses of introspective methods in general, especially as applied to children.

SUMMARY

IN THIS chapter we have dealt with the crude beginnings of meaning in the prevocal gestures of babyhood. We have seen how, gradually, definite speech sounds come to be attached to special objects and situations, so that a rapidly expanding body of "naming habits" is accumulated. The importance of careful training from the very first is clearly

indicated by the studies that have been made of children's speech.

Early in the course of this growth in vocabulary we see the beginnings of symbolic behavior; and we have evidence that at least in some babies there is such behavior, on a very primitive level to be sure, by the end of the first year. The crude beginnings of thought in the infant foreshadow the marvellous intellectual development of the first five years, a development of thought which makes the five-year-old child infinitely more complex and more capable of varied and discriminating living than the cleverest even of those "higher" animals who have been shown to utilize ideas.

When the baby has begun to use symbolic or thought responses, then, he has taken a great step forward. His behavior will now more and more be shaped not only with respect to objects and situations that are present, but also with reference to vanished and far distant things. Instead of immediately and more or less passively responding to internal and external stimuli, his overt reactions will be more or less delayed as internal responses become important. He will more and more interpret objects before responding to them. In other words, his world will take on meaning.

CHAPTER VIII

THE GROWTH OF MEANINGS

WHAT IS implied in saying that a child learns the meaning of a word or an object? If we first consider concretely how a particular word, let us say the word "mother," may acquire meaning for a child in terms of everyday experience, we shall better be able to analyze the psychological mechanisms involved.

To the baby a few months old the word *mother* means no more than any other combination of sounds. After he has heard the word repeatedly applied to his own mother, however, it has begun to take on meaning; for now when the mother herself is absent, and he hears the word, he may respond to it with some of the behavior which was formerly called out only by the mother herself. A year-old baby, told "Mother is coming," may begin excitedly to rock back and forth in his crib, to smile and coo. After the child has begun to "think," the word *mother* may evoke ideas, as well as emotional and overt responses.

Now as time goes on the child reacts to the mother, and to the word *mother* which is applied to her by himself and others in an ever widening variety of situations. She feeds him, and the name is thus associated with (tends to call out) pleasant feeling responses connected with the dinner hour. She bathes him, caresses him, tells him stories, and

tucks him in bed with a good night kiss. Thus the word *mother*, heard when the actual person is present, comes to elicit many positive reactions, and, when the child is old enough to think about his past experience, many related ideas. The word becomes capable of reinstating less pleasant responses, too, for the mother slaps his hand when he snatches at food, and speaks solemnly to him when he is naughty. Hence the word *mother* comes gradually to mean refraining from harmful actions.

In early childhood this word is likely to call up ideas of goodness, even of perfection. The mother answers all the questions the child can ask, and she tells him what is good and what is bad. Therefore he comes to think of her as an authority and a judge.

With the experiences of his later childhood, the meaning of the word *mother* alters still more. The child learns that his mother suffers, and that she sometimes makes mistakes; and when people speak to him of his mother, he may think of these things too. For a child whose mother has left home, has died, or has become insane, the word becomes charged with very special meaning. It may now evoke tears, disturbing terror-dreams, or feelings of loneliness and depression.

In later years, when the child, approaching maturity, has had wide acquaintance with other mothers than his own, in actual life as well as in books and plays, the word *mother* usually has much richer meaning than it did in childhood. For children brought up in accustomed ways, the word will have a more or less standardized meaning—it will have been associated with certain common experiences. But for each individual the shading of meaning will vary according to his special experience and the social maturity he attains.

NATURE AND KINDS OF MEANINGS

WHEN we say that the word *mother* means something to the child, we imply simply that this stimulus is capable of eliciting a variety of appropriate responses, mainly implicit, before any overt action is taken. To say that the child knows the meaning of a word does not mean that he experiences a definite something called "meaning," but merely that the word is a potential stimulus for varied responses. The word *meaning* is an abstract term to denote this fact.

We may now make a generalized statement of the process by which a child learns the "meaning" of an object. The reaction is always to the object in a situation. In the course of repeated experiences, reactions are made to the same object in varying situations. Whenever the total situation of which the object is a part varies the reaction too changes. Thus a variety of responses comes to be associated with the object. Hence when the object is later encountered the child does not react to it as he formerly did, but some of his responses are those which were called out by other parts of past situations. Thus the child reacts to these in their absence; and the wider the variety of situations in which he has encountered an object, the more meaning responses is that object now capable of eliciting.

We may classify meanings as perceptual, and call them perceptions, if they refer to objects actually present; or as ideational, if they refer to objects not present. When a child is reacting meaningfully to an object or situation which is actually present, we say that he is perceiving the object or situation, and we call the process perception; but when he is reacting with reference to absent objects or situations we say that he has ideas, or that he is thinking.

It is only through the gradual acquisition of experiences

and their organization in adjustment that the child's world assumes meaningful organization. While perception and ideas are always closely related in actual behavior, and function always as aspects of the total behavior of the individual, it is necessary to analyze them separately in order to see how they are acquired and how the acquisition may be guided.

PERCEPTUAL MEANINGS

WE SHALL NOW try to see what actual evidence we have from observation and experiment that the generalizations we have made about the growth of meanings apply to interpretations of present objects; and shall then describe the chief features of childish perceptions.

A perception is a preliminary interpretative response to a present object. As the total meaning which the object elicits at the time, it is dependent upon the character of the subject's past experience in reacting to the object, and also upon the nature of the total present situation in which the object is experienced.

Common perceptions are the outcome of gradual growth through trial-and-error experience in childhood. — Evidence for this generalization is derived from both experiment and observation.

1. Experiments on adults show that a perceptual situation, once broken up, will gradually be reorganized into a stable perceptual system. A famous example is the experiment of Stratton, who for about two weeks wore lenses which completely reversed directions in the world of visual space. Objects which were really at his right appeared to be at his left, and objects below him appeared to be above. Thus a stairway which led down appeared to him to lead up. At first things *looked* upside down to him, and he constantly made mistakes in reacting to common objects,

because his perception of their location was faulty. Slowly, however, through repeated reactions, he learned to make the correct adjustments to these objects, and as he did so, the objects came to look "right" — the world looked right side up again. Of course the objective position of things was not changed.¹

The writer carried out a similar experiment on forty subjects who wore prismatic spectacles which displaced objects twenty degrees to the right. All of the subjects, although ignorant of the conditions and the normal appearance of the room in which they worked, gradually but surely learned to react correctly. It is significant that Stratton observed that he learned first to re-perceive correctly the objects which he handled most actively, and that the writer found that no readjustment took place without active localizing movements.² To the adult, nothing seems so fixed in the nature of things as objective space, as "up," "down," and "square." These experiments indicate, however, that such perceptions depend on our specific human experience with things in reacting to them. "Up" means where our arms are, "down," near our feet, and so on. The experiments have demonstrated the possibility of a gradual trial-and-error acquisition of space perceptions in children.

2. Studies and tests of children themselves testify to the actuality of this gradual growth. Children at first confuse geometrical forms. As Arlitt says, "Normal four-year-olds will often attempt to pound star-shaped blocks into spaces which are cut to fit triangles."³ Terman in the Binet tests

¹ STRATTON, G. M., "Vision without Inversion of the Retinal Image," *Psychol. Rev.*, 4: 341-360; 463-481 (1897).

² WOOSTER, MARGARET (Mrs. M. W. Curti), "Certain Factors in the Development of a New Spatial Coördination," *Psychol. Monog.*, 32, No. 4 (1923).

³ ARLITT, ADA H., *Psychology of Infancy and Early Childhood*, p. 131 (McGraw-Hill, 1928).

found that ability to copy a square in recognizable form is not as a rule developed until the age of four, while it is not until seven that the average child can be expected to copy a diamond.⁴

3. Ordinary observation of spatial reactions is in line with experimental findings. In dealing with objects in everyday play, very little children give evidence of faulty perception of distance, form, and size. Psychologists have questioned the old belief that the baby reaches for the moon, but the desirable experimental tests have not been made. If a distant object is bright and clearly in the field of vision, infants are very likely to reach for it, according to common observation. The author's little girl, aged two, reached several times for a hat which had been hung on the branch of a tree several feet above her head, each time bringing her thumb and fingers together in a grasping movement.

Faulty perception of size is illustrated by the case of the little boy taken at the age of three on his first trip by train, who exclaimed with delight at the "little tiny horses" he saw from the window on the other side of a field. He had seen horses only at close range in the city streets, and these which objectively were smaller, that is, which made a smaller retinal image, he actually believed to be midget horses, not making the unconscious correction which is made by adults who are more familiar with horses. Very young children frequently make similar mistakes. They look from high office buildings and see on the street below men smaller than themselves, they see flying in the sky birds as big as cows. Such reports from very young children can not be adequately explained as due entirely to exaggeration after the event. Since the children have had limited expe-

⁴ Terman, L. M., *The Measurement of Intelligence*, pp. 57, 58 (Houghton Mifflin, 1916).

periences with backgrounds and changes of size with distance, such wonders must in part at least represent genuine perceptions.

As children run about and actively explore the house, the neighborhood, and wider areas, the naïve perceptions of the earliest years become more accurate. It seems to be only repeated experience in looking, reaching toward, walking to and around, and touching distant objects, which gradually enables the child to interpret distance correctly without actual exploration. Experiments have shown that the spatial meaning of a distant object depends upon such factors as the muscular strains of accommodation and convergence, the presence of intervening objects and shadows, and the degree of mistiness or clearness of the air.

Since habits of correct response to such changing stimuli are only slowly built up, in older children and even in adults mistakes still occur. For example, an adult accustomed to the hazy air of New England will make absurd mistakes in judging the distances of mountains in Arizona. But since our interpretation of distance depends upon a gradual process of learning to interpret sensory signs, a New England boy who goes to live in Arizona may, by the time he has grown up, be as good a judge of distance as a native.

4. There is a gradual increase during early childhood in accuracy of time perception. This is notoriously undeveloped in young children. "A day to childhood seems a year," and confusion in judging time is expected. Terman places the ability to tell the difference between morning and afternoon in the sixth year. Even the "sense of rhythm" which is supposed to be so fundamental, is thought by Arlitt, on the basis of observations of nursery school children, to be little developed in the child of three. "His skipping to music," he says, "is prone to be of the 'one-foot variety,'

and to bear little relation to the time which the music itself maintains." ⁵

5. Striking illustrations of the principle that stimuli take on adequate meaning only with experience are afforded by the observation of the process of learning to understand a foreign language. What at first is a vague jumble of sounds to the adult, with only crude rhythms and the emergence of some nonsense syllables, comes in time to arouse differentiated and appropriate responses—in other words, to be perceived as an ordered system of sounds. We may suppose that something like this takes place in the inner experience of the infant as he masters his own tongue. Childish experience with words continues to result in misinterpretations even after a large vocabulary has been acquired, as numerous anecdotes testify. When the writer was a child her mother used to admonish her after a prick or cut or burn, "Now remember, grin and bear it!" For years she heard this as "Grin and Barrett," and supposed that these presumably kindly old grocerymen lived in her mother's old home town in another state. One college girl confessed that until her senior year she had supposed there was a verb "to unsh." This idea was based on a misinterpretation of the phrase "unshed tears."

6. Trial-and-error learning in the growth of perceptions can be clearly observed in the progress of individuals subjected to special training which increases accuracy of discrimination along particular lines. The tea-taster and the expert judge of woollen cloths are the product of long experience in reacting to minute differences in stimuli; and little children are sometimes trained to develop abilities almost as remarkable. One little boy was purposely trained in outdoor lore from an early age, and at twelve he could identify

⁵ ARLITT, *op. cit.*, p. 131.

many varieties of trees with his eyes shut, merely by listening to the sound of the leaves in a slight breeze. The value to the child of such a specialized ability is questionable, since psychological experiment teaches that training of this sort does not increase the ability to make fine discriminations in general.⁶ The case is, however, a good illustration of the importance of specific experience in helping to determine the accuracy of perception.

We need more detailed evidence on special aspects of perceptual growth. Some valuable data we may expect from reports of observations of the growth from year to year of specific perceptions in individual children. Experimental studies, too, may be employed with younger children, and should some time give needed definiteness to our descriptions of perceptual growth. Meanwhile the lines of evidence which we have cited seem beyond question to establish the fact that even in the case of very stable perceptions, trial-and-error development does take place. Having seen that the present perceptual meanings which an object elicits in a person depend to a considerable extent upon the character of his past experiences with it, we may now go on to consider the influence on the perception of the total present situation.

The perception of an object is a function of the total situation of which the object is a part. — It is a commonplace of general psychology that the stimulus is typically complex. We do not react to isolated stimuli, though these may be abstracted for the sake of logical analysis, but to situations. The word "stimulus," in psychological discussions, is simply an abbreviation for "stimulating situation." Hence we should expect the perceptual interpre-

⁶ See STARCH, D., *Educational Psychology*, 2d ed., chaps. xiv and xv (Macmillan, 1927), for a thorough discussion of experimental work on transfer of training, with a clear treatment of theoretical implications.

tation of a present object to be influenced by other objects in the total stimulating situation.

1. The fact that it is the total stimulating situation, not merely the "central" feature or the one to which the individual is conscious of making the reaction, which determines the response, is very well illustrated in certain illusions. There is some evidence that children are more influenced by non-central features of the total situation than are adults.

In the famous Müller-Lyer figure, of two lines

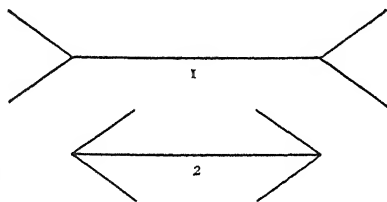


Fig. 13. THE MÜLLER-LYER ILLUSION
Lines 1 and 2 are equal in length.

which are actually of the same length, that one is perceived as shorter which is enclosed by "arrow tips" pointing outward. (See Fig. 13.) Another illusion illustrating the influence of neighboring objects on the perception of a given figure is the double circle illusion of Schumann's illustrated in Fig. 14. The outer one of the circles at the left is the

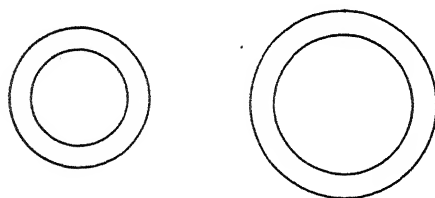


Fig. 14. THE SCHUMANN DOUBLE-CIRCLE ILLUSION

The outer one of the circles at the left is the same size as the inner right-hand circle.

same size as the inner right-hand circle, but it is perceived as smaller.

2. The influence of the total situation in perception is also well illustrated by certain experiments in sensory discrimination. In

1913 Bingham published a report of experiments in which domestic fowls had been trained to go to the larger of two circles (A) for food. (See Fig. 15.) After this train-

ing he substituted other circles (B and C), the larger of which, B, was the same as the smaller circle in the training series. The chicks now went at once to circle B.⁷

Five years later Köhler reported very similar results for four fowls, which learned to react correctly to the lighter of two shades of gray, regardless of the absolute stimuli employed. He showed that the same thing happened in the

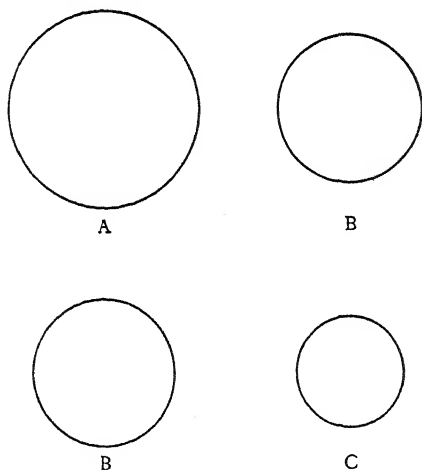


Fig. 15. REACTION TO RELATIVE SIZE BY CHICKS

Diagram based on description by H. C. Bingham, "Size and Form Perception in *Gallus Domesticus*," *Jour. Anim. Behavior*, Vol. III, No. 2, 1913.

above. The experiments illustrate the central emphasis of their doctrine, namely the importance of "*Gestalt*" (which may be translated "form" or "configuration") in determin-

case of a boy nearly three years old, and with several chimpanzees.⁸ Jaensch is said to have confirmed these results with a different method for fowls and for thirty-eight children between two and five years of age.⁹

Recently leaders in the German school of *Gestalt* psychologists have attached very special significance to such experiments on perception as the

⁷ BINGHAM, H. C., "Size and Form Perception in *Gallus Domesticus*," *Jour. Animal Behav.*, 3: 65-113 (1913); also the same author's "Visual Perception of the Chick," *Behavior Monog.*, 4, No. 4, p. 104 (1922).

⁸ KÖHLER, W., *Nachweis einfacher Strukturfunktion beim Schimpansen und beim Haushuhn*, pp. 45-48 (*Abh. d. Preuss. Akad. d. Wiss.*, 1918).

⁹ JAENSCH, directing the work of RIEKEL, *Zsch. f. Psychol.*, 1922, reported in VOLKELT, H., *Fortschritte der experimentellen Kinderpsychologie*, pp. 7-8 (Jena, Fischer, 1926).

ing the apprehension of a situation. It is the total configuration, the *Gestalt* psychologists insist, which is the basis of the perception, and not elements of the situation reacted to as such.¹⁰

Under the conditions of Bingham's experiment with the circles, the perceptual response must have involved meaning only with respect to the total situation and not with respect to the individual circles. We can not even talk intelligently about "the meaning of circle A" for the meaning as perceived and learned is apparently attached to the total single situation of which circle A is merely a part without any meaningful identity of its own. To say that in the first series circle A was perceived as "something to approach" while in the second series it meant "something to avoid" would be to misstate the case entirely. In the first series the meaning was that of a single situation with two parts and a single response to the whole: it did not involve a positive response to circle A and a negative response to circle B, but rather a single response of going toward the *part* of the whole which was smaller.

With the *Gestalt* interpretation as presented above, the author is in agreement. Such an interpretation, the student will see, is in line with the trend of modern stimulus-response psychology, which has emphasized the importance of organization, integration, and pattern in behavior. The theory that a perception is built up out of a number of simple sensory qualities which may be perceived as independent elements with an absolute value of their own is perhaps consonant with the old elementaristic Wundtian psychology once very prevalent, it seems, in Germany; but it has no defenders either in the more traditional functional

¹⁰ KOFFKA, K., *The Growth of the Mind*, pp. 145-148 (Harcourt, Brace, 1928); and KÖHLER, W., *Gestalt Psychology* (Liveright, 1929).

type of psychology in the United States or in the contemporary objective psychology which has grown out of it.

The *Gestalt* psychologists have called attention, in their peculiar terminology, to an important feature of perception which, although it has long been recognized, has been unduly neglected in theoretical discussions. It would seem, however, that the importance of such experiments as those made by Bingham and later by the *Gestalt* workers, has been exaggerated. There is no reason why psychologists should be astonished that Bingham's chicks reacted to the relative and not to the absolute size of the circles. After all, size has to be relative to be judged at all! The same consideration holds for Köhler's experiment with the grays. It is well known that the brightness value of colors or grays changes markedly according to the illumination and the distance, and hence in any experiment on discrimination the absolute values vary from trial to trial or day to day, unless the factor of brightness is kept experimentally constant. In the color perceptions of everyday life, when distance and illumination vary considerably with different observations, Köhler's principle must, then, be constantly illustrated.

Bingham assumed that his experiments showed that the chicks had general ideas, as if their reaction could be explained only by the assumption that they had an abstract idea of "this circle being smaller than the other." Since, however, as we have just shown, in experiments in adult discrimination such reactions are constantly being made without any conscious comparison on the part of the subject; and since after all in these experiments no response is made in the absence of the objective situation in question (see definition of "idea," chapter viii), Bingham's assumption is unnecessary. In fact, one might suppose that one reason why these experiments with animals and very young

children are significant, is that they show with especial clearness how fundamentally "naïve" and free from intellectual abstractions such complex perceptions may be, since they are made by organisms as simple as chicks and babies.

3. The process of perception is still further complicated by the possible influence in the total stimulating situation of internal stimuli, which we may call inner motivating conditions. Varying physiological conditions of the organism, such as hunger, satiety, fatigue, drowsiness, or "general vitality" may enter in as parts of the stimulating situation to influence the nature of the perception. A chocolate rabbit to a child who has had his Easter dinner may call out the meaning response "I'll play it's a horse and let it draw my toy cart," but later when the child is hungry, the total stimulating situation being different, the meaning responses may be represented by "I'll just take one bite." At one time the rabbit means plaything, at another time candy.

Again, as part of the internal stimulating situation various ideational motives, including desires, hopes, and purposes, may, as we shall show in the next chapter, help to determine the perception. For example, to a child who is constructing a make-believe country estate, his sister's new blue ribbon seems made for a trout stream.

4. There is evidence that the influence of the total situation is stronger for children than for adults. A study made by the author suggests that the error in judgment in the Müller-Lyer illusion is greater for dull children than for bright children, and greater for the younger than the older children, although the evidence is not conclusive.¹¹ Giering found that in a few school children the double circle

¹¹ WOOSTER, MARGARET (Mrs. M. W. Curti), *An Experimental Study of Bright and Dull Children*, pp. 97-99 (1915). Unpublished thesis in the library of the University of Nebraska.

illusion of Schumann was stronger than for adults.¹² The experiments on discrimination by Köhler and others, above discussed, afford definitely positive evidence on this point, for older children and adults, according to Koffka, tend more than younger children to react on the basis of "absolute size."

Characteristics of Perceptual Development in Childhood. — The tendency to react unanalytically to the whole is so strong in children that it may be said to be one of the special characteristics of perceptual growth. In dealing with those characteristics we shall first discuss this tendency, which psychologists have called *syncretism*.

1. Perceptions tend to become more analytical as the child grows older. A baby after learning to call his father "daddy" may call any man he sees "daddy." Later as he is checked on certain occasions when he responds thus, he may apply the word "daddy" only to dark men with mustaches, and still later only to his own father who is dark and has a mustache. A certain little girl for some time applied the name "string" to every long twisted object she saw, whether wire, hair, cord, or ribbon. In standardizing the Binet tests it was found that very young children could not tell what parts — such as nose or ears — were missing from pictures of the human head.

The perceptions of early childhood which are thus likely to depend upon general patterns or schemas, inhering in total situations, may be said to be syncretistic, that is, the objective situation touches off natural interpretations according to the child's experience, without reference to conflicting details to which he has not yet learned to respond.

The fact that perceptions of adults also are syncretistic

¹² GIERING, H., "Das Augenmass bei Schulkindern," *Zsch. f. Psychol.*, 39: 42-87 (1905).

is illustrated by experiments with the tachistoscope, an apparatus by means of which letters, words, geometrical forms, and the like, printed on cards, may be exposed for a very brief interval. Even if the interval is so short that the details on a given card can not be distinguished, the object (word, figure, and the like) may be identified on the basis of the general pattern of the situation, as suggested for instance by one or two clear details and the spatial arrangement of the rest. But this syncretism in perception is much more characteristic of the child than of the adult. In fact the first perceptions must be syncretistic, and analysis necessarily come later.

That a very natural course of development is from syncretism to analysis is illustrated by the first responses of young children to story books. For example, a two-year-old child, although he could not identify a single letter or a single word, was able to find in his book any of his favorite poems or stories which were asked for. "Little Jack Horner" or "Ba ba, black sheep," must have been recognized on the basis of the general "look" or pattern of the page. The word method of teaching reading, prevalent now for years, is based on the realization that it is natural for the child to react to whole words first, and only later to read by the putting together of previously perceived letters. Thus psychology teaches that it is by the analysis of wholes that the first development in perception proceeds.

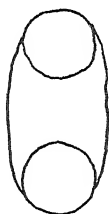
Lack of attention to actual detail in children's perceptions is well illustrated in their drawings. Volkelt studied reproductions of a cone and of a cylinder by children between three and seven years of age.¹³ He found that the children tended to make their drawings conform to a gen-

¹³ VOLKELT, H., *Fortschritte der experimentellen Kinderpsychologie*, pp. 29-32 (Jena, Fischer, 1926).

eral schema which they had in mind, regardless of the objective details in the model. Children who, after the draw-



Model



Reproduction

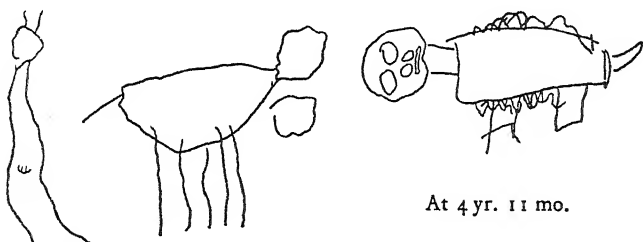
Fig. 16. DRAWING OF A CYLINDER BY A CHILD

From Hans Volkelt, *Fortschritte der experimentellen Kinderpsychologie*, p. 31. (Copyright, 1926, by Gustav Fischer, Jena. Used by permission.)

ings were made, were asked to pass upon the merits of the various reproductions, in some cases criticized the more accurate drawings severely, making scornful remarks about them. One little boy insisted on choosing as the best drawing of a cylinder one which showed circles at both top and

bottom, giving excellent logical reasons for his choice. (Fig. 16.)

Progress in the case of one child from more syncretistic to more analytical representation is well illustrated in the drawings of Figure 17.



At 4 yr. 11 mo.

At 3 yr. 6 mo. At 4 yr. 1 mo.

Fig. 17. DRAWINGS OF A DOG MADE BY A CHILD AT DIFFERENT AGES

From Ernst und Gertrud Scupin, *Bubi's erste Kindheit*. (Copyright by Grieben, Leipzig, 1910. Used by permission.)

In the schematic perceptions of the little child, adults often see a richness and a figurative character which seem

very poetic and imaginative. This figurativeness does not, of course, involve a conscious symbolism, but is inherent in the syncretism which, in allowing leading features of the situation to stand for the whole, makes for the actual confusion of very different objects. Thus when an automobile seen at night for the first time is called a "moon car," or when autumn leaves fluttering to the ground are called "teeny birds," it is not that the child sees similarities between objects which he knows are unlike, but that two objects elicit the same interpretative response because they have certain striking features in common. The very young child does not perceive the conflicting details.

2. Perceptual growth is marked also by progress from juxtaposition toward synthesis. Not infrequently children fail entirely to react to a complex object as a whole, but instead single out details which may be quite unimportant and ignore their relationship to the rest. This is well illustrated in spontaneous drawings. For example, a young child may draw his toy auto, showing the large round steering wheel between the two wheels beneath the box, and be perfectly satisfied with the effect. Volkelt reproduces a plasticine figure of himself made by his daughter, nearly five years of age. The teeth are shown as a row of round objects on top of the head, and the mouth as a ball some distance below the head!¹⁴

Piaget says that such interpretations illustrate the phenomenon of "juxtaposition," or mere placing together of parts irrespective of relation to the whole. He points out that as the opposite of syncretism, juxtaposition plays a complementary part in the growth of accurate perceptions.¹⁵ Neither the syncretistic type of interpretation nor mere juxtaposition

¹⁴ VOLKELT, *op. cit.*, p. 37.

¹⁵ PIAGET, JEAN, *Judgment and Reasoning in the Child*, pp. 58, 59 (Harcourt, Brace, 1928).

position are adequate, the former often ignoring important features of the objective situation, the latter neglecting important relationships. If an accurate perception of a given situation is to be acquired, then both the whole and the parts must be reacted to and finally come to be synthesized in a significant interpretation.

It may be pointed out that after all whether a given perception be regarded as analytic or syncretic depends upon the point of view of the adult observer, and is not an inherent characteristic of the child's response. The model of her father made by Volkelt's daughter may be judged in two ways. If the child's task was to show another person what her father looked like, as a person, then the illogical grouping of the parts represented simply inadequate juxtaposition. But if we look at the reproduction to see how well the schema or "idea" of certain important parts of the body has been shown, we see evidences of syncretism. As a matter of fact, the child's representation of the teeth *was* syncretic as far as the teeth were concerned — only a few were shown, and they were grouped in a semicircle in a schematic way. Whether the adult observer sees analysis or syncretism, then, in the perceptions of the child, depends upon the particular part of the objective scene he has in mind. And certainly in the building up of effective interpretations of any one fairly complex object in his environment, the child must react now to the object as a whole, now to parts, and finally to the whole again. The final development of an adequate interpretation of any objective situation must involve a synthesis based upon the complementary and interacting processes of syncretism and analysis.

3. In addition to the defective synthesis which they betray, the perceptions of young children are likely to be still fur-

ther distorted by the influence of the personal factor, or by what we might call, using Piaget's term, his egocentrism. The child is at first, of course, a non-social being, and only gradually acquires knowledge of the needs and the experiences of other people. It will, therefore, at first be his own needs and his own experiences which predominantly enter in to the total stimulating situation to influence his interpretative responses to others; and only gradually will knowledge about and interest in the experience of these others be important factors in his social perceptions.

The more narrow and personal character of the perceptions of children as compared with those of adults is particularly well illustrated in various stories of childish misinterpretation. One young woman known to the author thought for years, as a child, that the minister was referring to her dear Aunt Leta whenever he said the Lord's Prayer, "And lead us not. . . ." A little girl may regard her baby sister merely as someone in the way instead of as a future dear companion. To a child a bent old man shuffling along the street may seem merely funny. More rapidly in some children than in others, according to their natures and their training, do situations involving other people come to be adequately interpreted.

The fact that children's perceptions tend to become, as they grow older, increasingly more analytical, more logically organized, and more impersonal, may be expressed in the statement that with increase in age comes increase in accuracy. The perceptions of the young child are bound in the very nature of the case to represent, often, confusions between recalled and imagined data, to be distorted by childish interests and childish ideas, to be very inadequate as representations of reality. On the other hand, they may reflect what sometimes seems to be uncanny emphasis on important

features of a situation. In their spontaneity and their symbolism they may be fresh and poetic in a way not possible in the more accurate and practical perception of adults. But the perceptual meanings of an adult's world, although often less æsthetically satisfying than the child's, are of course more serviceable in making possible effective adjustment. For all their charm, childish interpretations as well as childish speech and childish manners must be early put aside if the individual is to develop normally toward maturity.

THE ORIGIN AND GROWTH OF IDEAS

AT THE same time that the child's ability effectively to interpret present objects is increasing, he is also learning more and more effectively to think about these objects, that is, to make adaptive responses with reference to them, in their absence. In other words, the child soon learns to increase his knowledge of objects, his potential ability to react to them correctly, by attaching new meaning responses to symbols which stand for the absent objects. These symbols considered in reference to the objects or situations for which they stand we call ideas. The possibilities of learning and adjustment are increased in proportion to the ability of the child thus to deal indirectly with the objective world.

Ideas of Memory and Imagination. — When the ideas which are utilized in this indirect adjustment simply represent past events, they are called memory ideas. For example a child wishes to go out to play but his coat cannot be found. His mother says "Think where you left it," and as he goes over in his thought one by one the places where he has been, he suddenly remembers the coat lying on a table in the basement. The ability to reinstate this past experience in symbolic terms makes possible more effective adjustment in the present situation.

Sometimes, however, adjustment to a future situation is demanded. Thus, the boy is going to camp this summer for the first time: what clothing shall he take? Having felt the cold of an evening in the woods, and been stung by mosquitoes near the lake, the boy is able to imagine what some features of camp life will be like; and the occurrence together in thought of ideas from the past, with reference to a future situation, makes possible anticipatory adjustment to that situation.

Imagination may, however, deal also with past or with absent present situations. Thus, a child in thinking of past experiences may add others which did not really happen for the sake of the pleasure it gives him or someone else. An eastern boy who has traveled through Oklahoma, and been disappointed at the absence of wild Indians and stage coaches, may summon up all sorts of ideas about these interesting things, and may even yield to the temptation to include them in the account of his trip which he gives to playmates. A child may also in his thinking supplement what he has heard of a distant place or person, so that he has an "idea" of that place or person which, though it does not at all correspond to the objective situation, has the color of reality to him.

A child in his imaginings can only utilize, of course, data from his own experience. These may be related in various ways, and the synthesis is new or created, but only in the sense that this particular pattern of thought has never occurred before. Imagination does create significantly new ideas, but they are the product of previous experiences.

Imaginal ideas help in organizing the child's thinking about distant places, and in reconstructing the past from the study of which he can learn very useful lessons. As human beings have become more civilized, the world as they

conceive it has greatly extended its boundaries, both in space and in time. Little children, under the influence of suggestions and questions from adults, will naturally also feel the desire to know this interesting world. And a preliminary acquaintance, gained through imagination, is a valuable start in that fuller knowledge which, under favorable circumstances, they will in time achieve.

The ideas of memory and imagination which add so greatly to the richness and meaning of the child's world are acquired only gradually, of course, as his experience widens. At first they are scanty, inaccurate, and confused. Ideas of memory and those of imagination have the same subjective characteristics — they may be represented by the same words or images, and call out the same responses. They differ only in objective reference: the first can be, theoretically, verified, the others do not correspond to actual experiences. Hence we should expect, in the very little child, constant confusion between the two, and this confusion is, in fact, a very prominent feature of the thought of the little child.

A little boy known to the writer, when asked what he had done that day, said, "Paul fly way up sky — way up." Here we have the idea of flying, originally, probably, suggested as a definite idea. Seeing a flying horse in the movies, a child may for a time actually believe that horses fly, his experience not having been such that the word horse arouses conflicting meaning responses. There is much inaccuracy of report in very young children owing to this natural mingling of the actual and the imagined. The earliest memories of one's childhood are especially apt to be unreliable — stories told by others, experiences desired but not had, may be conscientiously thought of as having actually been experienced.

Experimental studies of memory in young children

have brought to light some of the factors underlying the greater inaccuracy of memory and report in children as compared with adults. In the first place, it has been established by experimentation that capacity for remembering events experienced, even simple ones, is much lower in young children than in adults, and increases only gradually up to mental maturity, after which point it remains fairly constant until senile changes set in.

Considering the relatively limited memory capacity of young children even for simple objects such as colors and geometrical figures, it is not surprising that experiments on observation and report of complex scenes should reveal great inaccuracy. Stern developed special methods for testing accuracy of observation and report in both adults and children, and the experimental studies which he and his students made seemed so promising that in 1903 he founded a magazine for publishing articles on the "Psychology of Testimony" (*Aussage*).¹⁶ For children the chief method consists in presenting a standard colored picture ("The Peasants' Room" was most commonly used) for a certain length of time, usually about one minute, and then requiring the child to tell what is in the picture. The narrative report is supplemented by a careful set of questions planned in advance. The results of the many long and intricate German studies of "testimony" in children, made by Stern, Lobsien, Lippmann, Borst, Oppenheim, and others are well summed up by Colvin:

The chief single result of the psychology of testimony is that an errorless report is not the rule, but the exception, even when the report is made by a competent observer under favorable conditions. Errorless reports are commonly char-

¹⁶ STERN, W. (editor), *Beiträge zur Psychologie der Aussage*. (Barth, 1904, 1905, 1906).

acterized by a very small range, *i.e.* they are the reports of individuals who are extremely cautious and who state only what they are certain of. . .

The reports of children are uniformly inferior to those of adults. The extent covered is not great, the errors are numerous, but at the same time the *certainty is marked*. Between the ages of seven and eighteen the extent of the report increases rapidly. Although the accuracy increases at the same time, it does not grow with such rapidity as does the range. The one factor that is particularly responsible for the inferior reports of children is their excessive suggestibility, particularly in the preadolescent years. A considerable number of investigators have tested the suggestibility of school children, with rather surprising results. They all point to the fact that children up to the age of twelve or thirteen years can easily be made [through suggestion by questions] to give reports and make judgments that are quite at variance with the facts. Stern has found four different stages in the development of the child's capacity to report what he has experienced. Very young children enumerate only isolated objects or persons. A little later, about the eighth year, they report actions more carefully; but they first pay attention to relationships, spatial, temporal, and causal, at about the tenth year. Later still, there appears the capacity to describe the qualities of the objects concerning which they make their report. . .

The introduction of suggestive or leading questions very noticeably decreases the accuracy of the report for children, and to a certain extent for adults. . .

The simple practice of reporting, even without special training or conscious effort to improve, facilitates better reports. There is improvement in range and accuracy and in the assurance of the reporter that is warranted by the facts. Similar practice effects may be observed in the increased accuracy of replies to questions. The capacity of children to observe and report in a detailed and accurate manner may be improved by systematic training.¹⁷

¹⁷ COLVIN, S. S., *The Learning Process*, pp. 184-189 (Macmillan, 1917). Reprinted by permission.

Some of the German experiments on school children were repeated in England by Winch, whose findings were in general the same. Winch also conducted interesting experiments to see if by special training he could secure improvement in the ability to observe and recall correctly details of a scene. Results here, as in the German experiments, were positive.¹⁸

Doubtless ordinary observation and report in children is in most cases at least as unreliable as in these experiments. Indeed one would expect less reliability since observations are often made in the most casual and fleeting manner. Hence even from the most intelligent and sincere observers inaccuracy is to be expected, especially from the youngest children, but in a greater or less degree from children of every age, and also from adults.

The studies made indicate that very little if any of this inaccuracy is to be attributed to intentional falsifying. Parents often err in believing their children have lied to them, just as they frequently err in accepting their stories of events as representing what actually took place. Among the reasons for inaccuracy in report are natural errors in the original perception of the scene or event, confusion between imaginal and memory ideas that are aroused during recall, overconfidence on the part of the child, the tendency to be influenced by suggestive questions from adults, and the existence of a meager stock of related ideas to serve as cues for recall. Overconfidence on the part of the child in his own reports is one of the most important factors. There is no reason why the little child should distrust his own observations, unless something happens to show him his error. That something will naturally

¹⁸ WINCH, W. H., *Children's Perceptions* (Warwick and York, 1914); also "Can Observation Be Trained in School Children?" *Jour. Educ. Res.*, 15: 229-238; 314-326.

be a reminder or demonstration by an adult, and even then a critical sense may develop but slowly. The *Aussage* experiments as well as some of Piaget, to be discussed later, furnish objective evidence that children are extremely uncritical. Their "assurance," or statement of belief in the truth of what they report, very often is complete.

The tendency to be influenced by suggestive questions from adults is not hard to understand. Children from the first are accustomed to having adults answer their questions, tell them what is good or bad, and what they may or may not do. Why then as young children should they resist a suggestion made by an adult? Unless the adult suggests that the matter is a doubtful one, the child may be expected to believe in the truth of the first statement that occurs to him. It must be remembered that there are no reliable subjective criteria which enable the child to distinguish between fact and fancy.

Conceptual Ideas. — A concept is an idea in which the symbol, instead of standing for a specific absent object, stands for any one of a large number of objects, or for certain types of arrangement and relationship among objects. The symbol is capable of eliciting as its meanings the thought of certain features possessed in common by these classes of objects or by these situations. For example, the word "dog" has the meanings four-footed, alive, barking, and so on. The word "animal" means being alive, moving about freely, and having blood.

Concepts develop along with percepts in connection with continued trial-and-error experiences in reacting to objects. The child at first attaches the word dog to all stimulus patterns of a certain type. A two-year-old who has learned to apply the term "doggie" to a cloth dog and a fur dog, and to various pictures of dogs in books, is heard to say

"nice doggie" on seeing a picture of a zebra, or on catching sight of a squirrel in the yard. Gradually, guided by elders, he learns to say "doggie" only when certain features are present, and to react appropriately. He ceases to try to pet squirrels, and is not heard to exclaim "bow-wow" on seeing a cat. The development of the ability to make such discriminating reactions is, as Dashiell says, "one of the cornerstones in the building of man's intellectual achievements. It is the very basis of rational behavior."¹⁹

The child learns to make finer and more accurate discriminations in proportion to the richness of his experience. In the case of classes of objects with which he has had a great deal of experience, let us say with electrical toys, a given child gradually learns the names of and the appropriate reactions to very fine details. A boy of ten known to the writer had gained such expertness through the handling of electrical toys that he knew just what to do if something ceased to work, and was called in by his mother to repair household apparatus.

This discriminating ability must, at the very first, function on a sensory-motor level, but when the child learns to apply names to the different parts (or learns other symbolic responses), the foundation is laid for thinking about them. Soon in the absence of the object the name of the object, merely thought of, will arouse symbolic responses standing for its various features. Thus the word "dog" may elicit the thoughts four-footed, barking, and the like, according to the richness of the child's experience with dogs. Such an idea is a concept.

Dashiell points out that the term "insight" as used popu-

¹⁹ DASHIELL, J. F., *Fundamentals of Objective Psychology*, p. 495 (Houghton Mifflin, 1928).

larly and by some psychologists, is really a name for the keenness of discrimination which involves ability to respond to some special aspect of a situation, some particular stimulus or stimulus pattern, and he emphasizes the dependence of insight on experience with the type of situation being dealt with. The small boy spoken of above had keen insight into matters electrical, but he did not know when his brother, who played the violin, was off key. A certain high school girl can see at once what shade of ribbon is needed to match a sample; but she is overwhelmed by the intricacies of a railroad time-table, which she "simply can't make out." Although native aptitudes undoubtedly play some part in determining insight into such situations, to the psychologist the preponderating influence of training, and rather specific training, is clear.

Insight may consist in making correct responses to some detail of a present situation, and hence may consist of behavior which, although intelligent in a high degree, is not ideational. Or, if the responses are symbolic, and if the qualities or aspects of the situation are dealt with or compared in relation to the thought of the situation instead of the objective situation itself, then we say that the subject is thinking about the situation, is employing concepts, or even that he is reasoning. In many cases the observer is unable to say on what level of insight the solution of a given problem is taking place, as will be shown a little later in discussing the behavior of apes and children in obtaining objects by indirect means.

Really accurate concepts, that is, abstract ideas which are capable of calling out in the child symbolic responses standing for the common features of the class denoted, and those features only, are very slow in developing: they do not ap-

pear until the later years of childhood. This slowness is not for the most part due, apparently, to lack of ability to handle abstract concepts on the part of the younger children, but to the overwhelming number and complexity of the situations which have to be mastered, and to the irregular and interrupted character of the learning.

In the development of a concept we may point out two factors, the first of which is the process of learning to react in the same way, usually by naming, to the common elements in a large number of situations which differ in some respects. This is called the process of *abstraction*, and it is a necessary basis for *generalization*, the second factor, which involves the conscious association of these features with some common symbol which may later be applied to other objects: "This animal has four legs, a thick tail, and stripes. It is a zebra." Although it takes a long time under the conditions of daily life to build up abstract ideas, when the conditions are simplified as they are in certain experiments, or in daily life in which there is special teaching, then even very young children may master fairly complex general ideas.

Experiments by Sander and Heisz with children's building blocks illustrate in natural situations the difficulty of abstraction for younger children. In this experiment a structure was made of building blocks (*Bauklötzen*) all of one color but of different shapes. One block was missing. The child was required to find the missing block either in an irregular collection of other blocks, or in a collection arranged to form a pattern. As one would expect, it proved more difficult to find the missing block in the pattern than in the scattered group. In the former a higher degree of abstraction is involved, that is, a complex existent pattern must be disregarded in reacting to a stimulus

which was part of another situation. The ability to find the block, as measured in time required, increased sharply from the fourth year to maturity.²⁰ (See curves, Fig. 18.)

In daily life the process of abstraction is of course neither controlled nor understood by the child. It simply happens

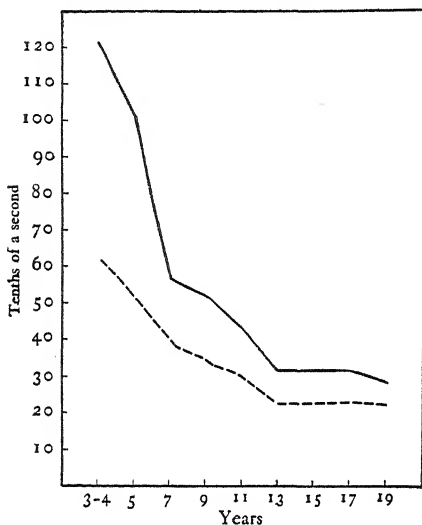


Fig. 18. DEVELOPMENT WITH AGE OF ABSTRACTION. UNBROKEN LINE SHOWS TIME REQUIRED TO FIND THE BLOCK IN A PATTERN; DOTTED LINE, IN A SCATTERED GROUP

From Hans Volkelt, *Fortschritte der experimentellen Kinderpsychologie*, p. 52. (Copyright by Gustav Fischer, Jena, 1926. Used by permission.)

that in his repeated experiences with objects some reactions are checked and others are not, so that a "name" comes to be evoked by certain objects and not by others. The baby hears the word "sugar" applied over and over again in special situations and learns to say the word in response to any situation which has the same general features, that is, which provides the same stimulus-pattern. But when he applies the name or reacts overtly to a situation differing in important respects

from the correct pattern, the consequences are likely to force him to change his response. For example, suppose the child, seeing snow on the ground, calls it "sugar" and takes some in his hand to eat. The resultant cold and wetness arouse new responses such as he has not made before in a similar

²⁰ See report in VOLKELT, *op. cit.*, pp. 49-51.

situation. If an adult is near he may learn then and there two new words, "cold" and "melt"; but in any case the tendency to apply the word "snow" and to eat it is checked.

After sufficient experience in reacting to varied aspects of such situations, the child says "sugar" and thinks of eating and other appropriate responses only when certain conditions are present. When he has reached that stage the child is in a position not only to perform appropriate responses, verbal and otherwise, on the proper occasion; but also to think of the essential characteristics of a class of objects when he is not confronted by any particular object. In other words, he has acquired a generalization, an idea which stands for a particular system of responses, and which can be applied correctly to actual situations as they come up.

The development of concepts presents the same general features that perceptual development does. In the next chapter, which deals with the organization of meanings in thinking, we shall see how the juxtaposition and syncretism which are both features of early concepts gradually give way to the analysis and synthesis which are necessary for logical thought. At this point we may merely call attention to some of the factors which are important in the development of serviceable general ideas about the world.

We should not expect that in all children the growth of ideas would show the same progress toward accuracy, richness, and maturity. Naturally the development of meanings, ideational as well as perceptual, would be related not only to age but also to such factors as native intelligence and social status, and especially to the stage of cultural development attained by the society in which the child grows up. We should expect that in general a child's ideas would be developed and enriched only to the limit of the experience of the adults surrounding him. Ideas of natural

objects and forces, of the nature of other human beings, of number, space, and time, will gradually become more numerous and richer in quality with experience and teaching, and will finally be narrow or broad, crude or refined, in rough proportion to the experience of the adult social group in which the child lives. A boy brought up in a primitive Indian community would have much cruder ideas than one of equal native intelligence brought up in a typical American town. All races presumably had at one time a very limited stock of ideas, just as each individual child has now. New words and new ideas were gradually acquired in the course of many generations of experience, in much the same way in which the child acquires new words and ideas in his own race or group. Thus ideas are meager in the early stages of development, both in the individual and in the race, and become rich and accurate in rough proportion to the amount of individual and racial experience.

CHAPTER IX

THE ORGANIZATION OF MEANINGS IN THINKING AND REASONING

FOR THE sake of a clearer understanding we have traced separately the development of special types of meaning, but there has been no assumption, of course, that either perceptual or ideational meanings ever function in isolation. They are part of a totality of adaptive behavior in which, as the child grows older, symbolic activity becomes increasingly prominent and important. In this chapter we shall deal with the development of symbolic activity, or thinking, as distinguished from other modes of adaptive behavior.

We may conveniently distinguish several varieties of thinking. To one type we shall apply John Dewey's designation, "chance and idle thought." This includes all the fancies, trivial and otherwise, which are apt to intrude themselves when we are not engaged in working out a definite problem — and sometimes when we are. It is illustrated by Mark Twain's fancy about the conductor — "Punch, punch, punch with care ! Punch in the presence of the passenjare !" But little of our idle thought is so distinguished by rhyme and rhythm. This casual and irrelevant thinking one is tempted to call childish, yet it bulks larger in the total thought of the average adult than one might suppose, and is present in the wisest of men.

Dewey in 1910 placed daydreaming in the class of chance and idle thought,¹ but that was before the Freudians had called general attention to the significant ways in which this kind of thinking may be ordered. It now seems logical to place daydreaming, along with nightdreaming and some of the "undirected" thought of the insane and of the little child, in a separate category, perhaps giving it the Freudian name of autistic thinking. This is an egoistic type of thought adapted to the needs of the thinker but not directed by the need for communication or other social considerations. It will receive some treatment in this chapter and also in later chapters, particularly in the one on play.

Thought which is a more or less faithful reproduction of past experience we may call recollection. To this we have already, in the preceding chapter, given some consideration.

A fourth variety of symbolic behavior, which we may call reflective thought, will be the chief subject of the present chapter. This is thought which originates in what Dewey calls a state of perplexity, hesitation, or doubt—in other words, in a problematic situation—and which involves the occurrence of suggestions, one of which finally puts an end to the hesitation or resolves the doubt. The suggestions may be applied as soon as they occur, or may be retained as beliefs, without any orderly search for the best solution or any comparing or testing. Or there may be a persistent and systematic search, involving the most careful effort to test the validity of the suggestions which occur as solutions of the problem.

The work of testing and proving hypotheses is called reasoning by Dewey and by Piaget. Some psychologists would use the word reasoning in a less restricted sense, as applying to any problem-solving which involves ideas,

¹ DEWEY, JOHN, *How We Think* (Heath, 1910).

whether or not it culminates in the process of comparing and testing hypotheses. After we have made an analysis of reflective thinking as it actually goes on in children we may more easily decide whether it seems preferable to use the word reasoning in the more restricted or the broader sense.

The investigation of reflective thought in children entails special difficulties. In the first place, we are prejudiced by adult ways of thinking which have become second nature to us, and prevent us from clearly understanding the ways of childish thought. Our very language, acquired uncritically and representing a systematization of racial experience, inevitably directs our thought in certain channels, makes certain conceptions seem so natural to us that it is sometimes almost impossible to form new ones on other bases. The words *mind* and *body*, implying a dualistic view, illustrate this point. But the child, starting afresh, has very different modes of thought at first, and an adult who would understand them must do his best to free himself from his peculiarly adult points of view, and try to put himself in the place of the child. This is not an easy undertaking.

A second reason for the difficulty in studying children's thinking is that there is no way of getting a clear first-hand account of it. The thought of little children is spontaneous, vague, full of implicit assumptions which he has never formulated because there has never been any occasion for formulating them. Hence in order to understand it the psychologist must find some indirect means of determining its characteristics. He may observe the child's spontaneous talk and action, and deduce from them the nature of the guiding habits and concepts. But this method will only slowly yield significant results. He may rely upon questions and conversations, but if he does he must remember that his remarks and questions destroy the naïveté of the thought

and are apt to influence its form and course, so that the questioner must try to infer from the very first replies of the child what the underlying ideas or beliefs are. The work of questioning the child in this way, with a minimum of suggestion, requires training, skill, and patience, a thorough acquaintance with children, and a good deal of tact and delicacy of perception, as well as a knowledge of the technical points at issue.

In spite of the handicap of an adult point of view and the fact that children's thought is inchoate and not directly communicable, the psychologist may consider it a most important undertaking to try to determine its nature. The chief reason is that such a study may throw a good deal of light on the characteristics of adult thought. When we see something of the origin and the process of growth of our chief ways of thinking, we may be able better to judge their value. It may be that we shall recognize in some adult thinking survivals of a childish stage which should, in the interests of effective adaptation, have been outgrown. Or again we might be forced to the conclusion that in some respects adult thought has developed too far, so to speak, has become too crystallized and formal. But in any case a genetic study of reflective thought is bound to increase our understanding both of its limitations and its advantages.

Owing to the difficulties inherent in this subject relatively little progress has been made in the past. Such men as Sully, Baldwin, Claparède, and John Dewey have observed keenly and have contributed stimulating and brilliant theories, but even their work has been affected by the almost inevitable "adultism." G. Stanley Hall and others have studied concepts and reasoning in large numbers of children; but their investigations have not been successful in overcoming the difficulties which we pointed out above. Scattered material

of great interest has been contributed in various reports on individual children, some of which have been referred to in the preceding chapter, and by workers in the field of mental testing. But it is only recently that we have had systematic investigations of children's thought which have succeeded, as it were, in getting beneath the surface.

The great advance in this respect has been made in Switzerland by Jean Piaget, to whose work we have already made reference. Recognizing the necessity of systematic first-hand observations and experiment, he has worked out very careful methods, and with the help of a number of collaborators has already produced some critically interpreted factual studies which are of the first importance. Our discussion of the chief features of childish thought will be based upon Piaget's work and will involve reference to some of his experiments and their results, but this treatment will give little idea of their extent and suggestiveness, and the reader should by all means examine some of the original studies.

THE PRINCIPAL FEATURES OF REFLECTIVE THINKING IN THE CHILD

Egocentrism. — At first children's thinking, like their other activity, is a sort of spontaneous play, answering to their own needs and impulses, but not under any necessity of conforming to "reality" or satisfying other people. In other words it is strikingly egocentric. Piaget has gathered two main types of evidence for this generalization.² One was gained through the study of children's spontaneous speech when with companions. Little children talk a good deal, and their remarks furnish a good index of their thinking. At the *Maison des Petits* (school for young children)

² PIAGET, JEAN, *The Language and Thought of the Child*, chaps. i, ii, and iii (Harcourt, Brace, 1927).

connected with the Rousseau Institute in Geneva, Piaget and his associates recorded the entire speech of a number of children over a period of about one month each, during periods in which the children were free to do as they pleased.

A prominent form of speech distinguished in this study was the "collective monologue" or pseudo-conversation in which a child, though apparently addressing himself to another child or children, in reality is talking to himself. He asks questions, but goes on without waiting for an answer. Although he may pause while another child is speaking, he afterward goes right on with his own train of thought, uninfluenced by what the other child has said. Piaget calculated for each child the proportion of egocentric remarks, including collective monologue, to the total number of remarks made by the child in the period of observation, and thus arrived at a rough mathematical statement of the egocentricity of the child's speech, a number which he called the coefficient of egocentrism. For children between the ages of three and five this was found to be between fifty-four and sixty; and, Piaget suggests, were there any way to measure the thoughts which the child keeps to himself, the proportion of egocentric thoughts would certainly be larger. For the children between five and seven the coefficient was lower—about forty-five. For two boys aged seven it was thirty and twenty-seven respectively (J. R. 257).³ These results, although based on only a few subjects, yet suggest a predominance of egocentric thought in the early years, with a gradual decrease, and a rather marked decline at about seven years.

Another type of evidence may be cited. An adult first

³ When citing concrete material from Piaget in this chapter we shall follow his custom of referring to the two chief studies cited in this chapter by initials, with number of page in parentheses. J. R. stands for *Judgment and Reasoning in the Child*; L. T. for *Language and Thought of the Child*.

carefully explained to a child the steps in the working of a simple mechanical device, and the child was then required to explain it to another child, the whole explanation and its reception being recorded. The same procedure was repeated for a set story told to the child. The results indicate that children between six and eight years understand each other's explanations very imperfectly, although their remarks show clearly that they are very confident of their ability to understand and to explain. The child who is explaining takes no trouble to repeat or make things clear, which Piaget interprets as due to an egocentric tendency to "talk to himself" and to take it for granted that what he says is understood. The other child pays little attention to the explanation, being under the illusion that he understands everything, while in reality he is simply assimilating what he hears to his own point of view, and is perfectly satisfied with himself because he does not realize the problem. Only further investigation will show to what extent these conclusions apply to other than the Geneva children.

The general conclusion is entirely justified, namely that the first childish thought is little directed or socialized; in other words, is marked by egocentrism. Because of this egocentrism, the period of about six to eight is the "stage of belief," to use Janet's words, a stage marked by overconfidence and by a certain imperviousness to experience. We need not be at more pains to demonstrate the unsocial, partly autistic character of early thought. These researches of Piaget are abundantly confirmed by ordinary observation, and are seen to be entirely in accord with what we know about the development of perception and indeed, as later chapters will show, of personality in general. Egocentrism is inevitable in early childhood. But in thus calling our attention to its importance in thinking, Piaget has made a

fruitful contribution, especially as he shows that the other chief features of child thought are intrinsically related to this egocentrism.

Lack of "Conscious Realization." — Young children often make remarks or engage in conversations which suggest that they realize pretty well the bearings of what they are saying. But Piaget presents extended studies of children's concepts and definitions, and their behavior in solving problems, to show that as a rule, in younger children, this impression of logical consistency which we get does not truly represent the facts. The children are not conscious of the grounds of their thinking, and cannot give an intelligent account of it.⁴ It is pointed out that although young children can do a certain amount of effective thinking (correctly solve some arithmetical problems, for instance) their procedure is not systematic, but their thought goes on in a series of fumbling attempts until finally they hit upon the right answer. Often they are sure it is right, but they are unable to recall just how they got their answer, or to make clear why it is right. To illustrate from a problem given to a seven-year-old boy: "This table is 4 meters long. This one three times as long. How many meters long is it? *Twelve meters.* How did you know that? *I added 2 and 2 and 2 and always 2.* Why? *So as to make 12.* Why did you take 2? *So as not to take another number*" (J. R. 139). Occasionally Piaget supplied matches for the problems, and the children would fumble with them, sometimes solving the problem entirely by manual procedure, sometimes handling the matches only part of the time, and sometimes doing the fumbling entirely "in their heads."

Other illustrations of the "lack of conscious realization"

⁴ PIAGET, *Judgment and Reasoning in the Child*, chaps. i, iv, and v (Harcourt, Brace, 1928).

in young children are taken from an investigation of their concepts and definitions. The definition of objects in terms of use, of which we have spoken in an earlier chapter — “A fork is to eat with” — shows a lack of awareness of the logical meaning of the term. It is after the age of about eight that children in general begin to show awareness of classes and, finally, of general characteristics. We may illustrate again by reference to the concept of life. A child was given the name of a familiar object, and was asked, “Is it alive?” and then after the reply, “Why is it (or is it not) alive?” The children’s answers showed that these names evoked fairly consistent meanings. For example, one child’s answers would show that he considered anything alive that moved *of itself*. But he could not express this condition. A seven-year-old child may clearly believe that the sun is alive, but deny life to a boat and a motor car. Yet he is greatly perplexed when asked to explain why the latter are not alive. His conception is implicit (in the ordinary meaning of the term), but the child is not aware of it; that is, he has never formulated in words the essential meanings of the objects he is thinking about (J. R. 146-169).

On the basis of this analysis Piaget concludes that the reasoning of the young child before seven or eight is a mental experiment, consisting of a series of discontinuous judgments which follow one another like overt movements, so that the child is not aware of the relation between them. The reason for this “unconsciousness,” Piaget says, lies in the egocentrism of childish thought. Since the child is reasoning only for himself, there is no need to be aware of the mechanism; his attention is turned toward the external world, toward, we may say, the results of his thinking, not the process itself. His thought remains “unconscious” because it is sufficient for the purposes of action. It is when

other people begin to ask questions, to interrupt, to express doubt as to the results obtained, that the child begins to "realize his thought." The questions asked in Piaget's studies, for example, constituted social stimuli of this sort.

Now it is an important fact, Piaget says, that when owing to social pressure the child is forced to carry on trains of thought on an entirely verbal plane, in circumstances which do not permit the manipulation of objects, difficulties appear which have already been conquered on the plane of action. For example, if a child of about seven is shown three colors of differing degrees of brightness, he can see that one of them is both darker than one and lighter than the other; but years later he has great difficulty in solving a problem like this: "Edith is fairer than Suzanne; Edith is darker than Lili. Which is the darkest of the three, Edith, Suzanne, or Lili?" Not until the age of eleven could most of the Geneva children answer correctly. The social requirement of carrying out the operation entirely by thinking creates a new problem, and the child has to learn all over again how to adapt himself.

In general, Piaget would, it seems, consider the period before the years seven to eight as the period of which this "empirical" mode of thinking is most characteristic, and during which the mental experiment is likely to be carried on by means of partly manual fumbling or in the presence of the objects thought about. Between the ages of eight and eleven or twelve the child learns how to manipulate verbal meanings as he once manipulated objects, and is becoming ever more "conscious of his mental operations."

No one has studied so thoroughly the actual processes of empirical thinking in children as has Piaget, or traced in such a penetrating way, by means of systematic investigations, the progress made by the child in powers of logical

analysis. Any one who would follow intelligently the intellectual progress of a particular child should read the original studies with their wealth of concrete material. The interpretation Piaget gives to these studies seems, however, inadequate in some respects. In so far as he implies that the trial-and-error mode of attack on a problem, with a lack of realization of the logical processes involved, is characteristic of early childhood only, it is misleading. To be sure he states in various parts of his books that children go through these stages of thought irregularly and at different rates, and that in some adults thought is still egocentric; but one gets the distinct impression that he believes normal development involves outgrowing of these early empirical trial-and-error methods of thinking, and that by the age of about twelve they are no longer characteristic. Later on in this chapter we shall present reasons for considering that all thinking, all reasoning even, is trial-and-error in character.

Inability to Understand Relationships. — The fact that the thinking of the young child is egocentric is related to his inability to see things from any other point of view than his own. The child is the center of his own universe, the point of reference for every judgment, and it is with difficulty that he learns to think of objects in relation to other people or to each other. Childish errors in talking of relationships, as for example of members of a family, are familiar to all who know children, but the extent and significance of this "inability to handle relations" has not been sufficiently recognized. The Geneva investigators have gathered a mass of interesting evidence on this point, from which we shall cite only a few illustrations.⁵

A boy of seven and a half named Jacq is asked, "Have you

⁵ PIAGET, *Judgment and Reasoning*, chaps. ii, iii, and v.

any brothers? *Two* (Paul and Albert). Has Paul any brothers? *No*. You are his brother? *Yes*. Then Paul has some brothers? *No*." An explanation is given and apparently understood. But this conversation occurs an hour later: "Has Albert any brothers? *One* (Paul). And Paul? *One* (Albert). And your sister? *Two*" (J. R. 84-85).

Two hundred and forty children between the ages of four and twelve were questioned as follows: "How many brothers have you? And how many sisters? (Let us suppose that the child has a brother A and a sister B.) And how many brothers has A? And how many sisters? And how many brothers has B? And how many sisters?" Only nineteen per cent of the children between four and five were able to give the right answers, and twenty-four per cent between six and seven. Between eight and nine the percentage was fifty-five, between ten and eleven, eighty-seven, and not until twelve did all of the children answer correctly (J. R. 98).

Other tests were designed to see how the children understood the relation of right and left. At the age of five three-fourths of the Geneva children named correctly their right and left hands. But the fact that these words were absolute designations of a particular limb, involving no awareness of the logical relations, is shown by their replies when asked to name the right and left hands of a person standing opposite them. This nearly three-fourths of the children were unable to do.

One aspect of this inability to understand the relativity of ordinary terms is seen to be an absolutistic view of the world. Things are as the child sees them. Boys of Geneva until seven or eight years of age believed that the moon followed them on their walks. Wood floats upon water be-

cause it is light in the absolute sense, and not because it is lighter than water. An enemy is a person with certain disagreeable characteristics, and the young child is unable to conceive that he who is an enemy of one person may be a friend of some one else. A part or fraction of an object is thought of as something in itself.

Places have an absolute location. The writer remembers being greatly puzzled, as a little child, on hearing that some neighbors while visiting in Iowa had stayed in Des Moines. These two names stood for absolutely independent entities to her. Piaget found much confusion on this score among Swiss children. A similar realistic and absolutistic tendency is illustrated in children's difficulties with boundary lines, which they often expect to see as black lines laid out on the earth. One consequence of egocentrism is thus a naïve realism in which the child's point of view determines his whole perception and thought.

It is not difficult to see that these pervasive childhood habits of judging things from the one point of view, of interpreting the world in a realistic and absolutistic way, may persist into adult life. We have seen that logical difficulties which have been overcome in dealing with concrete objects reappear when the material is more abstract; and this suggests that those who have passed beyond the absolutistic stage in thinking about boundary lines and the motion of the sun, may still be in that stage as far as other things are concerned. In psychology this may be illustrated, perhaps, by the persistent tendency to think of meaning as an entity of some sort, and to think of the mind as an immaterial substance instead of a certain relationship among phenomena. Probably the greatest advances in science within the present century have come from the broader extension of the concept of relativity, the ability of human beings increas-

ingly to think in terms of objective relationships instead of reasoning from the self outward. Thus the consideration of the difficulty of handling relations in childhood throws light on reasons for ineffectiveness in adult thinking.

Juxtaposition. — The same egocentricity which keeps the young child from appreciating objective relationships results in a great deal of disconnectedness in his thinking. Statements are made in succession, but not related or contrasted. They are simply juxtaposed. This is the case when the Geneva child of eight says that he is a Genevan, but denies that he is a Swiss, although he states correctly that Geneva is in Switzerland. Shown a drawing of a circle representing Geneva, and asked to make another to show Switzerland, he draws another circle beside the first (J. R. 122).

Juxtaposition as a result of failure adequately to conceive of relations between objects and events independently of the self is well illustrated by the manner in which the child deals with what to us are causal sequences. In his narrative he is likely to mention events in illogical order, connecting his statements simply by "and" or "and then"; and if "because" is used it is not in such a way as to show any clear appreciation of physical causality. When Piaget gave children sentences to complete containing the word "because," they responded very often with incorrect uses of the word, often completely inverting the relationship, as in this completion by a child of seven — "That man fell off his bicycle because he was ill afterward" (J. R. 19).

Elsa Köhler reports a similar example in the spontaneous speech of a little girl of three and a half, "The doll has hid herself because no one can find her," but regards this simply as a slip. She gives other examples showing a correct use of the word — "The hen is fat, because she eats a lot," and

"The duck drinks water because he is thirsty."⁶ This may seem to call in question Piaget's statement (J. R. 225) that instances of "because" indicating logical relations are almost completely absent from the spontaneous talk of the child. But he does say that "because" to indicate *psychological* relations, those in which the child personally is implicated, is used correctly, as, for example, in "because Daddy won't let me." Now we might say that such a "psychological" relationship is involved in both the statements about the duck and the hen, because the little girl sees these animals in situations which are very familiar to her — she herself drinks when she is thirsty, and has been told that she will grow nice and fat if she eats a lot.

But whether or not we accept Piaget's special interpretation of children's use of "because," we must grant that different parts of an explanation are often given in a sequence which to adults seems illogical and disconnected. We do find the same sort of juxtaposition in their complex narratives that we observed in the preceding chapter in their drawings and their definitions.

Syncretism. — In discursive thinking as well as in perception juxtaposition is related to syncretism. The deficiency of logical order and lack of appreciation of objective relationships does not mean that there are not "subjective unities" in the child's thought. Piaget suggests, in fact, that in the first thought of the child there is nothing but connectedness — everything is connected with everything else, not in a logical way, but because things simply are given together, belong together. This is true because of the child's egocentrism, which makes him assimilate all his experience to his own point of view,

⁶ KÖHLER, ELSA, *Die Persönlichkeit des dreijährigen Kindes*, pp. 188-190 (Hirzel, Leipzig, 1926).

interpret it according to subjective schemas of his own. It is when the child is forced to react to changed external conditions, or to the questions and commands of other people, that this primitive unanalyzed whole of experience is broken up; and the very disconnectedness of the parts which the child thus deals with in relative isolation is perhaps a consequence of the exaggerated intimacy of the subjective unity which had prevailed. Naturally this original subjective unity is only postulated by Piaget—by the time the child is old enough to furnish evidence of his thinking we must suppose that it has been much broken up by the “exigencies of experience,” and the thinking of the child as we know it exhibits both juxtaposition, which we may call objective disconnectedness, and syncretism, which we may call subjective schematism.

Common observation indicates that to the child events which occur at the same time obviously belong together. The child often seems amazed that any question should be asked, and sometimes just repeats the statement, satisfied with the answer. “Why does your daddy go to the office?” is answered by, “He goes there every day.” Or the child may say, “Because he does,” or simply, “Just because!” which is a common reason given by little children, and evidently seems quite sufficient to them. In the Geneva investigations children would invoke any one feature of an object to explain any other. Children of five and six, asked why the sun did not fall down, regularly gave such answers as, “Because it is high up,” “Because it is hot,” and the like.

Piaget suggests that some of the superstitions or magical beliefs of children are partly to be explained by this syncretism. We may illustrate by an example which Piaget himself cites in another connection. One of his collaborators reported that if on his way to the dentist he passed

by a particular street, and the dentist later hurt him, he took care on the next visit to go a different way, so that the dentist would hurt him less.⁷ To see how a similarly inadequate notion might develop in a more complex situation, let us suppose that a little girl at school happens to be counting to herself in a certain way just before she makes a particularly good recitation. The association between the two events may give rise to a belief on her part that if she can succeed in counting up to twenty-five with a certain rhythm between the asking of a question and her reply she will "have good luck"; and this may be extended to other situations. The connection is there, subjective though not explicitly formulated. Adults similarly rely upon irrational personal notions or schemas of their own, with the origin of which they are not familiar and which they have never thought out, but which may have compelling influence, at times, on their behavior.

A study of proverbs, made at the Rousseau Institute, illustrates particularly well the persistence of syncretistic thinking on an abstract plane, after the relations between perceived situations have been mastered. Each child was given a number of common proverbs and a number of sentences each of which corresponded in meaning to one of the proverbs, and was required to pick out the proper sentence for each proverb. Up to the age of eleven or twelve the children chose almost at random, but once having made a choice, they tended to accept it as correct, and justified their choice by explanations which showed clearly that they were not inventing, but that the two statements were now connected in a subjective schema that possessed real unity for them. A nine-year-old boy chose for the proverb, "White

⁷ PIAGET, *The Child's Conception of the World*, p. 144 (Harcourt, Brace, 1929).

dust will ne'er come out of a sack of coal," the sentence, "People who waste their time neglect their business." This boy explained that the meaning was the same, because people who waste their time neglect their children, who then become black (as coal is) and therefore need to be cleaned.⁸

We may interpret Piaget's treatment of juxtaposition and syncretism about as follows. Between the years seven and eleven, on the average, the early syncretism of the child's experience gives way, under the pressure of individual experience and especially of social stimulation, to more analytical habits of thinking. He is forced by the conditions of experience to learn to react differentially to differing and changing aspects of the situations which he encounters; and as he does so, he gains "insight" into their essential features (cf. p. 245), and is able to make general statements about them which are more reliable, that is, more useful in effecting adaptation, than the vague subjective schemas which formerly prevailed. Thus the world of the child's experience is being continually broken up into more discrete groupings, and shaped again into more effective forms, as he learns better to adapt himself to his changing environment of things and of persons. The juxtaposition and syncretism which are characteristic of early thought give way to analysis and synthesis; intuitive thinking tends to become rational thinking. But this development is not, we may assume, completed in all children; and in no child, probably, is it completed for every aspect of his thought. There still remain, for almost every adult, certain regions of his thought which are as "impervious to experience" as the ordinary thought of the little child, regions in which the original syncretism still, as it were, holds sway.

⁸ PIAGET, *Language and Thought of the Child*, chap. iv.

The features of childish thinking which we have been considering are especially characteristic of the ages before seven and eight. From about that time, which, we remember, seems to mark a decided decline in egocentrism, the child becomes increasingly able to handle relations, to take the point of view of others, and to reëxamine his own thought. This increasing "consciousness of his thought," in Piaget's terminology, means that the child is acquiring more and more abstract concepts, that he is learning to generalize. A child of seven may say, "The sun is alive because it moves," but has not thought of the formulation which is really implied by this, namely, "All objects which move are alive."

It is when the child is stimulated by the questions, doubts, and attitudes of others that he pays attention to the implications of his statements in an effort to justify them. Thus he is stimulated to observe sequences of events; and he becomes able, when dealing with observed facts, or remembered or imagined facts, to see them in their correct logical relationships. But, Piaget says, during this middle period of steady growth in the ability to deal logically with observed or remembered data, there is still lacking the capacity to carry on formal reasoning. The child is only able to deal with situations in which he believes—situations, that is, which stand for actual or possible experience. This is shown by the responses to the Binet test, in which the child is asked to say what is foolish about the statement, "If I ever kill myself from despair, it will not be on a Friday, because Friday is an unlucky day. . ." Children under eleven were not able to make the necessary assumption, for if they did not have this particular belief themselves, they insisted that the absurdity consisted in saying that Friday is an unlucky day (J. R. 62-74). Thus children were unable to deal with the

statement *as an hypothesis*. Now according to Piaget, in formal reasoning it is necessary to be able to start from assumed premises, regardless of their truth or falsity. This the children cannot do because of a lingering egocentricity which prevents them from entering into any other point of view, even for the sake of argument. Their thinking is thus still on an empirical plane, that is, related either to situations which they observe, or can remember, or can see would be possible for them. It is not until after the age of eleven to twelve that the average child can carry on the abstract type of logical thinking which involves making provisional assumptions.

If we accepted the definition of reasoning held by Piaget and somewhat differently stated by Dewey, and considered that it involves the comparing and testing of hypotheses as such, then certainly, if these conclusions proved to hold generally, we should have to say, as Piaget does say, that the child is incapable of reasoning before the age of eleven or twelve. One reason which might well be advanced for adhering to this conception is that it might have a good effect on practical dealings with children. Perhaps too much time is spent in trying to instruct, through formal reasoning, young children who are really incapable of profiting by such methods.

On the other hand, one could point out practical disadvantages in the use of this definition. It might encourage the drawing of a sharp line between the thought of children and adult reasoning, whereas there is really a gradual development in that ability in which we are after all most interested: namely, the ability to think effectively in problematic situations. It may also be urged that if we should keep the definition of the term so restricted, we should have to say that reasoning is extremely rare. Moreover, we should

have to classify as reasoning many a logical but practically useless course of thinking, while refusing so to dignify other cases of quick and effective use of thinking to obtain adjustment in problematic situations. On the whole it would seem that a broader definition of the term, as the use of ideas in solving problems, has distinct advantages over the traditional conception adhered to by Piaget. This definition, which is entirely in line with Dewey's treatment of thinking and may well have been suggested by his work, is more objective than the other, seems closer to the common usage of the term, and permits us to think of reasoning as present in the very young child and growing in effectiveness with years. What Piaget has called reasoning we could then distinguish as formal reasoning or the rational elaboration of meanings (Dewey), and recognize it as a late and rather rarely employed, but exceedingly valuable development.

Adopting the definition of reasoning as ideational problem-solving, let us inquire what are the essential factors in the reasoning process, and how the characteristics of child thought so brilliantly treated by Piaget, are related to these factors.

FACTORS IN REASONING

IT HAS been pointed out by psychologists, notably by Carr,⁹ that reasoning regarded as ideational problem-solving has the same essential features as the overt mode of solving problems which we call *perceptual-motor* learning. Both types of adjustment originate in a problematic situation, in which the animal or person is prevented from satisfying some motivating need because of the presence of an obstacle or hindrance of some sort. Both involve a varied attack, the only difference being that the attack involves overt move-

⁹ CARR, HARVEY A., *Psychology*, chap. ix (Longmans, 1925).

ments in one case and ideas in the other. In both there is elimination of unsuccessful movements or the ideational counterpart of these, namely inadequate suggestions. On the perceptual-motor level this elimination is determined largely by the sensory consequences of the act; and on the ideational level by the knowledge of the consequences of the suggestion or of its logical implications. Finally, the successful solution, which is a part of the equipment of the learner or solver and the occurrence of which is more or less a matter of "chance," is fixated in both cases — through a series of trials in the case of overt acts, and through practice and memorization in the case of ideational solutions, although often very little repetition, or no more than one occurrence, is necessary for the retention of an idea.

A feature of the process of solution in reasoning is the verification of hypotheses or suggested solutions, by putting them to the test of an overt response or application. This step is absent, as such, from perceptual-motor learning, for here each act is its own verification. It is so important, however, in reasoning, that we shall discuss it as a special factor. One factor in reasoning, namely fixation through memorization, we shall not treat as such at this time, since the principles involved seem fairly clear and it might more properly be given a fuller treatment in a discussion of memory.¹⁰ We shall here take up, as the three chief factors in the reasoning process, the problem, the solution, and the verification of the solution.

The Problem. — The first problems which the child encounters are perceptual in character; that is, they involve some difficulty in adjusting to a present concrete situation. When the child gazes longingly at a high pantry shelf, seeing no means of reaching the cooky jar, he is responding

¹⁰ Cf. chap. viii, pp. 238-244.

to such a problem. Concrete problematic situations continue to occur throughout life, of course, but more and more complex ones are likely to be encountered as the child grows older, while the stock of ideas which may be utilized in meeting them increases enormously. As soon as the child is able to reconstruct past or future events ideationally, he begins to encounter ideational problems ("What if I lose my ball again on the way to school?"), and in advance of the actual situation he may think out modes of adaptation. One little six-year-old girl, dreading the heat of the summer afternoons, carefully screwed caps on some fruit jars in the coolest part of the garage one evening, expecting to let the cool darkness loose next day. Gradually as his experience widens the child is able to face problems that are more and more remote — "What shall I do when I am grown up?"; "What kind of games would I play if I lived in the country?" But all through the years of middle childhood it is very difficult for the child — impossible, in fact, according to Piaget — to assume a problematic situation which is not probable or possible for him. He must believe in the possible truth of the premises before he will reason, owing to the great difficulty he has of seeing that other points of view than his own exist. This difficulty of adopting the points of view of others of course puts serious limitations on both the range of problems and the fertility of the individual attack.

Since all reasoning starts in a problematic situation, adults who wish to encourage it in children will see to it that they have genuine problems with which to deal. Just as in the case of sensory-motor learning, so in the case of reasoning, the importance of providing strong motives and providing or pointing out genuine problems is evident.

The Solution.—In any problematic situation which an organism encounters responses will occur, native or acquired, according to the nature of the situation. If the subject has had experience in meeting somewhat similar situations and has acquired knowledge of different possible modes of procedure, various ideas will be aroused, constituting hypotheses or suggestions of possible solutions of the problem. These suggestions may occur one after the other in a more or less haphazard way, or they may be subjected to logical analysis and systematically varied.

The series of responses in this "varied attack" upon a problematic situation may be entirely overt, partly overt and partly ideational, or entirely ideational. In any case we have a mode of attack which is trial-and-error in character, for we cannot predict how soon the correct response will occur, and the organism will keep on responding in some way as long as the motivating stimulus is dominant, until a response happens to occur which solves the problem.

Experiments by Köhler on problem-solving in chimpanzees,¹¹ which have been followed by a number of others employing the same general methods with both animals and young children, beautifully illustrate the essential identity of the motor and ideational methods. Köhler put his chimpanzees, when hungry, in situations where food was present and seen but could not be obtained except by manipulating objects in a particular way. For example, a chimpanzee was put inside a barred cage. Outside was a banana, which the animal could obtain only if he fitted together two hollow sticks which lay near by, thus making one long enough to rake in the banana by reaching the stick through the bars. Or the banana was suspended by a string from the ceiling in such a way that it could not be reached directly,

¹¹ KÖHLER, WOLFGANG, *The Mentality of Apes* (Harcourt, Brace, 1925).

but could easily be obtained by moving a box underneath, or by piling two boxes one upon another in a particular way. In most of the animals there were a good many overt movements which were not successful. The animal would run about, push the boxes now in one direction, and now in another, and the like, in a more or less desultory manner. Occasionally, after pausing and eying the boxes, a chimpanzee would suddenly go to a box, rapidly put it in the right position under the banana, mount, and obtain the food. It seems highly probable that such a solution is genuinely ideational; that a symbolic representation of the act (an hypothesis) precedes its execution. The hypothesis is implicit only, to be sure, and not rationally elaborated; but it takes its place among the overt acts as one of the varied means of meeting the situation. Sometimes the idea happens to be correct, at other times it does not work. For example, an animal which seems to have "got the idea" of piling two boxes one on the other underneath the banana, may fail because he sets a second and smaller box above the open top of the first: he has not happened to grasp all the essential points in the situation.

Other investigators using about the same methods with young children have observed that they behave very much like the chimpanzees, except that there is more ideational activity.¹² In the case of the children the presence of ideas is often shown clearly through their speech. We may cite an example of persistent and varied attack, including ideational responses, from among a number described by Dr. Alpert in her study of problem-solving by preschool children, in which she placed children as nearly as she could in

¹² ALPERT, AUGUSTA, "The Solving of Problem-Situations by Preschool Children," *Tchrs. Coll. Contr. to Educ.*, No. 323 (1928); BLATZ, W. E., "A Comparison of Human Subjects and Chimpanzees in Similar Controlled Situations," *Proc. Amer. Psych. Assoc.*, p. 51 (1928).

the same sort of situations that Köhler used in some of his work with chimpanzees. One little girl aged three years and two months was placed in a play pen outside of which was an attractive toy. Inside the pen were two halves of a fishing rod, by means of which the child could obtain the toy only if she fitted them together. This little girl who had had experience in reaching with sticks, first tried to get the toy by extending one of the sticks over the top of the pen, then tried the other, repeating "I can't" over and over. She then tried putting the stick out between the bars, struck it against the floor, whined, reached over the top again, straining, then tried to climb out. In the next two trials she tried these and other means, such as reaching out her hand between the bars and shaking the pen, saying at one time, "Dolly does not want me to get him," a thought which if seriously entertained might have stopped the "attack." In the fourth trial she started reaching as before, and asked the experimenter to move the toy nearer. Then she said, "Let's try big stick on little one," after which she proceeded to fit the two sticks together carefully, reached out, and got the toy. Here the "chance success" which solves the problem is clearly an ideational representation of an act, an hypothesis. The attack is varied or somewhat random, and the discovery of the solution is a matter of chance, as Carr explains, in that its nature and time of emergence cannot be predicted or foreseen.

Köhler, and Alpert following him, refuse to call a "chance success" any solution accompanied by, or the result of, insight. But most psychologists do not take this position. The time and nature of ideational solutions can no more be predicted than motor solutions, and whether either occur depends upon the nature of the situation and the equipment of the organism. Not even a perceptual-motor attack, of course,

is purely random and chaotic—chance is a relative term implying unpredictability. In the varied and somewhat unpredictable behavior that is likely to ensue when an animal encounters a problematic situation, ideas may be few or prominent. Even if the attack is entirely ideational it is a trial-and-error process in which the correct idea may occur soon or late or not at all, depending on the circumstances.

Children rapidly acquire ideas—memorial, imaginal, and conceptual—which enable them increasingly to “reason out” the solution of the problems that confront them. But for some types of problems and in some circumstances overt movements are employed by adults. Ruger in a well-known experimental investigation required adults to solve mechanical puzzles, and reports varying amounts of ideation in the solution. Sometimes solutions occurred through random overt manipulation alone, but usually various hypotheses were also framed and tried out one after the other in an attempt to effect a solution.¹³ Various studies have been made of reasoning in adults in which the entire attack was ideational, and the process of trying out and discarding hypotheses was closely observed. These studies show, as we should expect, that even in adults there is often not a systematic effort to try various types of solution, and sometimes a method of procedure which has failed to bring success in preceding trials is, just the same, repeated again and again. The human subject, even though adult and intelligent, is prone to fall into stereotyped modes of attack, and often simply puts forth the first answer that occurs to him, without effort to recall whether it worked before, or to compare it first with other answers which he might give. Thus an ideational solution may not be very completely varied, and

¹³ RUGER, H. A., “The Psychology of Efficiency,” *Arch. Psychol.*, No. 15 (1910).

in many ways the intelligent adult may still behave at times much like an animal in a puzzle-box.¹⁴

In such behavior as that of the little girl in Dr. Alpert's experiment, we do not find at all that comparing and testing of hypotheses which Piaget says is the essence of reasoning. In her case each hypothesis as it occurred was immediately translated into action, and the hypothesis as such was not thought *about* at all. It is almost the same sort of thinking that sometimes occurs with adults when working out problems. Sometimes, for example, when arithmetical* operations are required, one device after another will be tried in the hope of getting a solution which will check, and the bearings of each device are not considered. The adult subject may simply sit by, as it were, and let suggestions more or less passively arise according to the situation, trying out the various ones to see if they work but not actually tracing out their implications before the trial. This is why old methods that have failed may be revived time and again. Thus it seems probable that in most reasoning in young children and in a good deal of adult reasoning what Dewey would call rational elaboration is absent.

In the most effective reasoning, however, there will be systematic consideration of the bearings of each hypothesis that occurs. The thinker supposes that the act takes place, and then traces out the consequences. If he has wide knowledge in the field, he will be able to tell better what the consequences of a suggested solution would be, than a person of limited knowledge. After considering the bearings of an hypothesis the thinker may reach the decision that it is not a good one, that the effects of its application would not solve

¹⁴ HEIDREDER, EDNA, "An Experimental Study of Thinking," *Arch. Psychol.*, No. 73 (1924); PETERSON, JOSEPH, "Experiments in Rational Learning," *Psychol. Rev.*, 25: 443-467 (1918). Compare HAMILTON, G. V., *An Introduction to Objective Psychopathology*, chap. vii, pp. 240-259 (Mosby, 1925).

the problem. Thus the suggestion is not acted upon in any way and the thinker reconsiders the problem, with the result that another hypothesis occurs which is similarly analyzed. Experience in handling hypotheses has enabled human beings to formulate logical devices which help to determine the probable relative validity or usefulness of different hypotheses, and a knowledge of these devices will be helpful in reaching conclusions. But no application of logical rules or devices will enable a person to invent a solution which has not been suggested in accordance with the nature of the problematic situation. The solution must originally come from the experience of the thinker, and the logical manipulation of meanings which we call formal reasoning affords no guaranty that a correct solution will be reached. In other words, however abstract the situation becomes, however remote from concrete situations the problem, and whatever concepts are utilized in dealing with it, the process remains one of trial-and-error adjustment.

It is evident that in general the more variable the attack, that is, the greater the number of possible solutions, the more likely it is that the correct solution will occur. This means that a child will always be handicapped in comparison with an adult through relative paucity of ideas, just as a person specially trained in a given field will have an advantage over one who is not; and that the individual who is able to assume the point of view of another will be more fertile in suggestions than one who is restricted to his own or a very narrow point of view. The ability to entertain a large number of hypotheses ranging over a wide field and representing various sorts of experience, is seen to be fundamental for effective reasoning. One who is widely versed in practical knowledge or knowledge within a given narrow sphere may reason very effectively in problematic situations

demanding adaptation within that sphere; but for the solution of more abstract problems or those involving adaptation to distant or future situations of some complexity, a much wider knowledge is essential. Through teaching and through books and conversation children learn solutions which in the experience of the race have been found to work, and in this way they may profit by the accumulated knowledge of the race without going through the process of learning and of discovery as individuals.

Besides the possession of a wide stock of ideas, training in those methods of attack which have been found helpful by others is also an important factor in effective reasoning. The study of formal logic is not essential to effective elaboration of meanings, but it is sometimes an aid. A knowledge of the psychology of reasoning is more helpful for practical purposes than a knowledge of formal logical procedures. Individuals who know the value of persistence and a widely varied attack will have an advantage over others who trust to some faculty and the knowledge of logical procedures, and believe that reasoning depends chiefly on a mysterious "reasoning power." The ability to approach a problem in a spirit of play, with a willingness to consider any suggestion whatever, no matter what the source, is seen, from the point of view here developed, to be very important.

Verification.—The final step in a complete act of reasoning, Dewey insisted in 1910, is verification, the process of putting a solution to the actual test. In the primitive reasoning of the little child, as illustrated in Alpert's experiments, this step almost inevitably occurs, for the ideas arise in concrete situations, and are immediately translated into action. The very little child has not formed the habit of delaying or comparing hypotheses previous to application. But when the problem is more abstract and a number of

hypotheses are involved, the matter of verification is not so simple. In that case immediate overt adjustment is not required. After an analysis has taken place a certain suggestion is accepted as reasonable; that is, the thinker believes that if it were put into effect the consequences would satisfy the motivating need to some extent. But it has not been possible to consider exhaustively all of the factors in the situation, and there is the theoretical possibility that some of the discarded suggestions might be better. Meanwhile, until an actual trial can be made, the accepted solution is retained as a provisional hypothesis or as a belief.

In problematic situations to which an overt adjustment must or can be made, verification proceeds by direct overt trial. In many cases, however, the problem is not an immediate practical one, as, for example, the problem of accounting for the origin of rain; and in such a case the thinker may gradually gain verification of his solution by watching events as they occur in nature. Or he may make experiments in which he reproduces the assumed conditions to see if the result corresponds with his theory. Very often, however, conditions are such that verification cannot be obtained for a long time. This is the case when the situation is very complex and the trying out of the suggested solution involves a number of practical measures the efficacy of which it is hard to judge. The trial of federal prohibition as a solution of the "liquor question" illustrates this point. In the case of some theories or beliefs direct verification can never be made; and this is most likely to be true when the original problems are of a highly abstract character. Many beliefs in the fields of philosophy and religion are thus unverifiable.

It is in the case of problems requiring complex solutions, or highly abstract problems, or in fact any problems which

do not demand or cannot receive immediate verification, that there is most opportunity for inadequate thinking and the retention of irrational beliefs. We have suggested that adults are prone to react ideationally in an incompletely varied manner, and that the suggestions which occur to them are by no means regularly submitted to careful comparison and analysis. Where verification is not demanded, we shall expect them, therefore, to entertain many highly unreasonable beliefs. Moreover, we shall expect that these beliefs, in the absence of convincing checks, will tend to correspond to their desires, prejudices, and previous habits of thinking. This will be true because such factors constitute parts of the total motivating situation. That stimulating situation is basic in the problem, and actively influences conduct throughout the course of the thinking, until some solution occurs which satisfies it to some extent, and thus ends its dominance. Naturally those solutions which correspond most closely to the habit-trends of the thinker and his personal desires will afford him most satisfaction, in the sense that they keep him from being disturbed by thoughts which might conflict with those trends and desires. Some of the irrational modes of thinking which serve as a substitute for genuine reasoning which involves a freely varied attack, we shall take up in the next chapter, in connection with the problem of motivation.

The consideration that the absence of a need for verification favors hazy and irrational thinking suggests one of the most important reasons for the fact that childhood thought is as a rule "wishful" and full of crude and even contradictory beliefs. For in young children the need for verification is conspicuously lacking. Why? The answer may be sought in a consideration of the egocentrism and the "incommunicability" of early thinking. In the course of his

experience the little child rapidly learns ideational meanings for the things he sees and the words he hears; but these are implicit only, and really do not take definite shape, become formulated as beliefs which can be expressed to others, until doubts and questions arise. It is his increasing intercourse with other people that provides the series of checks and questions which finally force the child to a clear statement of his notions, and stimulate him to seek justification and verification for them.

Piaget asked a large number of young children this question, which is so phrased as not to be suggestive, "When you go out for a walk, what does the sun do?" The spontaneous remarks which followed indicated clearly an implicit belief, now perhaps stated in words for the first time, that the sun followed the child constantly; and they showed also a complete absence of doubt as to the correctness of the belief. The statements were made promptly and confidently, and in all seriousness. Some of the children believed that the sun watched over them, purposely gave them light, or looked to see if they were good or naughty. In general it was not until the age of eight, which according to Piaget marks a rapid decline of egocentrism, that the children began to show doubt and hesitation about the idea that the sun followed them; and not until still later had they accepted the theory that the sun stays in the same place all the time.¹⁵ Thus, questions or expressed doubts on the part of others "liberate convictions" which were formerly implicit only; provide conditions for the acquisition of habits of self-criticism and analysis which lead the child more and more to seek verification for his beliefs; and make it possible for him finally to regard his ideas as hypotheses only, until they have been submitted to actual verification. In the

¹⁵ PIAGET, *The Child's Conception of the World*, pp. 214-219.

process of seeking verification for an hypothesis, a new problem is likely to arise. And so doubt leads to doubt, question to question. Thus it is that in a normally responsive and active child, his thoughts about the world, subjected more and more to actual test, become more accurate; and the field of his knowledge comes to exhibit a more ordered unity in place of the early vague syncretism.

But the "incommunicable" character of the thought of young children cannot alone explain their failure to seek verification for their beliefs, for we find unhesitating confidence persisting after these first naïve years, in regard to beliefs which have been clearly formulated. Stern and the *Aussage* investigators, we recall, as well as the Swiss group, found this self-assurance more characteristic of the years of middle childhood than of later years; and anyone who knows ten-year-old children well can furnish corroborative testimony. A further reason for the persistence of this primitive attitude into middle childhood and even adult life, is its relation to the well-known early belief in the infallibility of the parents, with the habit of depending on authority which this belief encourages. As long as it never occurs to the child to question the judgment of the parents, he himself will lack a certain stimulus to question his own. He cannot very well build up a belief in the value of suspended judgment until he sees it illustrated, and has a chance to learn what are the results of such an attitude. Now parents must consistently play the rôle of omniscient beings while the child is very little; and not a few are willing to let him maintain this early trust in their judgment as he grows older. Some more or less deliberately encourage this dependence.

The result is that even after the child makes the inevitable discovery that his parents may err, he tends merely to

transfer his trust to other authorities, for example to writers of books and to teachers. And these, for the most part, keep up the parental fiction of infallibility, having the attitude of "laying down the law" for the good of the child. Teachers as a rule, not realizing that "mistakes" are an essential part of a true reasoning process, so frown upon them that the child comes to think of them as dreadful things. With such examples constantly before him from the earliest years, it is to be expected that children will tend to cherish their own beliefs. There will be little chance for them to build up a conception of the value of hypotheses as opposed to fixed beliefs. On the contrary, seeing adult authorities constantly rush to the defense of their own ideas as the true ones, the children, still under the influence of their childish attitude of trust, will suppose that this is the thing to do—that to admit the possibility of being in error is somehow unworthy. Thus in the give-and-take of his everyday experience is the child likely to develop a primitive and inadequate conception of truth.

We might consider what would be the effect if parents should adopt the policy, from the first, of admitting their own mistakes, quite simply and naturally, whenever they occur. Some see in such a policy an important means of encouraging the child to develop a respect for truth and a tentative habit of thought; others insist that this would be a dangerous policy in the early years when the child is not yet able to think for himself. The first theory is being tried out by a few parents—one mother known to the writer is careful always to say to her young children, "Mother thinks this is best," instead of "Mother knows best." The second policy is the traditional one.

Applications. — Our analysis of the chief steps in reasoning as a trial-and-error method of adjustment in problematic

situations suggests certain applications. The adult who would teach a child to reason well should not wait until the child is old enough to handle formal logical relations, but must seek from the first to develop the "problem-solving attitude" which is basic in all reasoning. To that end he will try to provide genuine problems, and will whenever possible withhold his aid in their solution. He will make possible an increasingly varied attack by giving the child as rich an experience as possible; so that he may have a broad and flexible knowledge both of things and of people, and so that he may learn to appreciate points of view other than his own. In order to develop in the child the ideal of maintaining an attitude of suspended judgment rather than dogmatic belief, and devotion to truth rather than authority, the wise parent will refrain from claiming infallibility for himself or anyone else, and will consider that any belief is open to question. But, knowing that the only real test of the adequacy of a theory is the sincere and consistent application of it which involves the step of verification, he will encourage the young thinker, by example as well as by precept, to act consistently on the basis of those beliefs and theories which, in the light of the experience of the race as he knows it, and of his own careful thinking, seem the most reasonable.

CHAPTER X

WHY CHILDREN LEARN: THE PROBLEM OF MOTIVATION

WE HAVE considered at some length the main ways in which children act: how they respond at birth, how they become conditioned to new stimuli, how they acquire complex motor habits, how they learn to speak and to think, and what forms their reasoning takes. As yet, however, we have paid only incidental attention to the "why" of all this activity. What is it that makes the baby so active? Why does the child romp and rest and sleep? Why does a two-year-old persist so tenaciously, day after day and week after week, in such activities as unlacing and lacing his shoes? What impels the older child to wonder what makes rivers flow and what the sun does when it has set, and where dreams are and what the mind is like? What conditions underlie the daydreaming, the giggling, and the general restlessness of the average adolescent? The answer to such questions involves a consideration of the problem of motivation.

THE NATURE OF MOTIVATION

WE MAY, in the words of H. A. Carr, define a motive as "a relatively persistent stimulus that dominates the behavior of an individual until he reacts in such a manner that he

is no longer affected by it.”¹ Hunger is a clear example. It has been found that sensations of hunger in human beings are probably the subjective correlates of organic stimuli, arising from the rhythmic muscular contractions of the stomach. These continue, with brief intervals, until food is taken, when the contractions cease and the individual, under normal conditions, is no longer hungry. The stimuli involved are persistent; that is, they continue until removed by the adaptive act of eating. And they are dominant; that is, they arouse vigorous and continued responses which prevent the individual from reacting in a thoroughly integrated way, at the same time, to other stimuli.

During the time in which the motivating stimuli are dominant, others, of course, may affect the individual, since he is acting in a wider sensory environment. A hungry baby continues to cry and to move restlessly until he gets milk; but meanwhile he may respond temporarily to many other stimuli—to the voice of the nurse, to the sight of a bright ball dangled in front of him, to the sudden opening of a door. All of these stimuli affect the nature of the total activity, but they do not constitute motives, for they are merely incidental or transient.

The same thing may be said of many stimuli which merely touch off well automatized complex habits, such as the dinner bell which starts all the boarders to the dining room. Here the motive is hunger, and the bell merely gives a different turn to the directed set of responses already going on. So it is, perhaps, with most of the external stimuli to which people respond during the day—these result in minor responses or touch off trains of activity, which furnish their own motives and distract or check or further activity already dominated by a continuing motivating stimulus.

¹ CARR, H. A., *Psychology*, p. 73 (Longmans, 1925).

The motivating stimuli may be either internal or external. Examples of internal motivating stimuli are found in hunger and in sex stimulation, the stimuli concerned in a stomach ache, or the kinæsthetic and other stimuli affecting a child who has sat still too long. Examples of external stimuli which may constitute motives are a loud continuing noise, such as that from a wood saw, a noise which may first elicit cringing and shrinking, and finally movements of escape; or continuous heat or cold leading finally to behavior which changes the stimulus either through modifying it directly (*e.g.* putting out the fire), through escape, or through providing shelter.

The term "want" or "need" is sometimes used as synonymous with motive, and this usage is consistent with the definition proposed above if these terms are used in a strictly objective sense, as referring to the underlying stimulating situation. Dashiell uses the expression "tissue need" or "drive," to refer to the native organic conditions which may dominate the organism. He would restrict the word "motive" to the dominant organized tendencies which are acquired.² The writer sees a disadvantage in maintaining such a distinction. In the first place it is not clear that it is helpful to emphasize a distinction between native and acquired factors in motivation. We shall see that native motives soon become greatly modified, and that motivation is typically very complex, so that in practice it would be very difficult to pick out the strictly native factors in an intricate motivating situation.

In the second place Dashiell's treatment might imply that while in native motives (tissue needs) there are definite stimuli affecting some part of the body, in acquired motives

² DASHIELL, J. F., *Fundamentals of Objective Psychology*, chap. ix (Houghton Mifflin, 1928).

there is likely to be merely some vague general "line of action." Now the great merit of the definition proposed by Carr is that for the vague notion of "consistent lines of action," as applied to learned motives, it substitutes the clear-cut hypothesis that acquired as well as native motives involve a *persistent stimulus*. This conception is widely applicable. We can apply the hypothesis that a motive is a stimulating situation even though we have to include as stimuli conditions which exert their effect directly, and not by way of receptor-neural-effector circuits. For example, a chemical substance in the blood may perhaps act directly on skeletal muscles to alter their tonus. Or a total situation (e.g. amount of activity) prevailing in the cortex of the cerebrum at any time may possibly influence the character of thinking without first affecting definite receptors. Certainly we know that the physiological condition of neurones, whether they are under pressure for instance, or at an unusual temperature, influences the passage of the neural impulse.

It seems likely that motives constitute physical forces which in human beings commonly act through definite sensory channels. But whether they always do or not, it is helpful to think of motives as stimuli, defining a stimulus as any physical force which exerts a direct effect upon the activity of the organism, either through sensory channels or by acting directly upon body tissues. This definition would include the conditions or tissue needs which dominate the behavior of animals without nervous systems. We would say for example that the "food seeking" behavior of an amoeba is a series of responses to an organic motive. It would also include any neural conditions which may be found to initiate activity.

According to our conception, to say that a motive is sat-

isfied means simply that something happens which changes the stimulating situation so that it no longer dominates the individual. The means of satisfying a given motive may be legion. All the hungry infant does is to cry and keep on crying. When he has learned to creep, and has become used to being fed in the dining room, he will probably, when hungry, creep to the dining room; and only if the food is still lacking will he then cry. When he has learned to speak, he may call out for the food, and later he will ask politely for it. He will learn to sit at a table, to use his knife and fork, and to chew his food properly. Older people learn to plant grain, to gather and store fruits and vegetables, and to cook meat, and all these habits are different ways of satisfying the hunger motive.

A popular use of the word "motive" confuses the actual *moving* factor and a particular means used to satisfy it. A person, asked what is his motive in going down town, may reply, "To eat at the Palace Restaurant." Psychologically speaking, this is incorrect, for it is hunger, not eating, which activates him.

CLASSES OF MOTIVES

AT THE beginning of life the infant's behavior is dominated by comparatively few and simple motives; but even by the end of the second year the average child shows an intentness and stubbornness in carrying on certain lines of activity, so that his actions are often unpredictable and embarrassing to the parents, and testify to the emergence of strong personal "interests" other than those involved in hunger, thirst, and the like. With the years these interests multiply indefinitely, and when the new physiological stimuli of puberty enter in to complicate the situation, the motives which may

be aroused and function in any one personality are so numerous, so tangled, and so hard to get at, that many parents give up in despair.

We may gain help in understanding the intricacy of motivation by considering first what the child has to start with in the way of motives; and then the classes of motives which arise from the modification of native motives and the acquisition of entirely new ones.

Native Motives.—Certain physiological “states” incident to the normal functioning of the organism are innate and can be counted on as more or less important factors, according to the circumstances of his life, in the behavior of every human being. Most of these are operative at or soon after birth. They include the internal stimulating conditions involved in hunger, thirst, defecation and urination, sex (appearing in full strength at puberty), internal pain or pressure, lack of air, fatigue (a need for rest), drowsiness, and restlessness or the need for action.

As a result of experimental study we know pretty definitely just what are the internal stimuli and what are the receptors involved in some of these motives, such as hunger. In most of them, however, the precise stimuli have not yet been isolated, but we do know that each corresponds to a definite condition of organs or tissues, and that these tissues are richly supplied with sensory nerve-endings and more or less specialized receptors. Hence it is reasonable to suppose that the organic conditions exert their influence on behavior as stimuli acting through regular sensory channels. The varying metabolic changes in the tissues must involve, for example, extensive chemical stimulation. Varying degrees of contraction or relaxation in muscles provide stimulation of a kinæsthetic type. The pressure of undigested food, of waste matter and gases, and the accumulation of liquids

in containing sacs, would afford continuing mechanical stimulation.³

Among native internal motives we must include the physiological state which persists after a native emotional response has occurred. We have seen that native emotional response-complexes consist largely of internal reactions. There may be changes in tonus of smooth or visceral muscle. This kind of muscle contracts much more slowly than skeletal muscle, and may remain for a longer time in a contracted state. Experiments by Cannon and others have shown, moreover, that the cessation of digestive activities, which is a characteristic response in emotion, may be of long duration. The peristaltic movements in the stomach may be absent, and the food may lie undigested for many hours. There is evidence also that one type of reflex response in emotion consists in the liberation of glandular secretions into the blood. These substances may augment and prolong certain effects already produced by the reflex effects of the exciting stimulus.⁴ Thus we have convincing experimental evidence that, even without prolongation due to learning, the physiological effects of a strong emotion may be lasting enough to dominate behavior for a time, and hence to constitute a motive.

Besides the native internal motives we have listed, certain external stimulating situations will, in the absence of any opportunity to learn, dominate at times the behavior of an individual subjected to them. These include intense light,

³ HERRICK, C. J., *Neurology*, 84-101 (Philadelphia, Saunders, 1915); WATSON, J. B., *Psychology from the Standpoint of a Behaviorist*, pp. 58-59, 64-67 (Lippincott, 1919). LASHLEY, K. S., in an article called "Physiological Analysis of the Libido," *Psychol. Rev.*, 31:192-202 (1924), presents evidence bearing on the physiological basis of sex behavior and attacks Freudian theories of sex motivation.

⁴ CANNON, W. B., *Bodily Changes in Pain, Hunger, Fear and Rage* (Appleton, 1915).

extremes of temperature, continuing loud sounds — in fact, any stimulation which is intense enough to be biologically harmful. Besides intensity, external stimuli may have other characteristics which cause them to dominate behavior. For example, a person's activity may be dominated by faint sounds gradually increasing or decreasing in intensity, or by objects moving slowly across the field of vision; and it may well be that it is because of the native organization of the individual that stimuli presented in this manner are dominant.

Acquired Motives. — All native motives, even after the first few weeks of life, become greatly complicated by acquired factors. They are changed and supplemented both through sensory-motor learning and by ideational activity.

From early infancy conditioning is important in widening the range of stimuli which may dominate the child's activity. To illustrate, it is at first only a certain internal "physiological state" which causes the infant to be active and playful. But after he has become accustomed to romping with his mother or father, and later with other children, the mere presence of one of these others will serve as a strong stimulus to activity, even if the child is really tired and would naturally rest or sleep. For the original intraorganic stimulus a new external stimulus has been substituted. Moreover, this external stimulus, setting up new activities, may result in changing again the physiological condition so that the child's "need for action" is prolonged. In the case of hunger the mere sight or smell of a favorite article of food or of the dish in which it is served, or the sight of other people eating, may set up the same responses that natively would be set up only by actual hunger pangs. The child who begs for food is not always activated by physiological hunger.

Intraorganic motives which give rise to negative responses also become attached to external stimuli. The smell and sight of violets came to elicit nausea in one young girl, as the result of a hospital experience when she lay sick for days, with a bowl of violets near her bed. Now she cannot bear to have them in the room.

As applied to emotions, change in motivation by conditioning is exceedingly important. The positive emotional behavior at first elicited only by "bodily well-being"—food, warmth, patting, and the like—very soon is aroused strongly by the sight or voice or touch of those closely associated with the well-being; and the resulting organic states may just as definitely dominate behavior as if they had been aroused by the original stimuli. In this process we have the basis for those attachments to members of the family which are often dominant throughout childhood, and sometimes unfortunately, throughout life. Similarly, anger responses or general withdrawing responses, with their organic aftermaths, may come to be elicited by the people or things connected with the original restraint or pain or other emotion-producing stimuli; so that this sort of conditioning lays the basis in childhood for all sorts of fears, aversions, and resentments.

In all this conditioning of "tissue needs" or of emotional states, the possibilities of complication are greatly increased when the child learns to use words. Through verbal conditioning he may, under social tuition, acquire abiding emotional "sets" toward an enormous range of stimuli. He may come to like or dislike certain sounds, sights, or colors, so that his æsthetic appreciation is affected; he may become prejudiced in favor of or against certain theories, according as they are associated with high wages and good food, or with unemployment and a struggle for necessities; he may

in various ways learn to hate or to love people he has never seen, in a part of the world which he will never visit: all this because words may take the place of actual situations in arousing emotional responses.

The little child's equipment of native motives begins soon to be supplemented, also, by an ever widening stock of complex sensory-motor habits. These at first are acquired in the manner described in the chapters on learning, as "solutions" of problematic situations. For example, the baby learns to climb up or down the stairs at meal time, as the case may be, "to get to the dining room." But once this complex series of coördinations is in process of being established, it becomes interesting, or acquires stimulating power, in itself. The baby who has for the first time just succeeded in getting to the bottom of the stairs may immediately clamber up again and repeat the descent; and he may do this again and again until he is tired. Later the mere sight of the stairs, at any time of the day, is likely to be followed by an attempted climb. As he learns to do other complex things—to dust the furniture in his nursery, to climb the little ladder outdoors, to pedal his tricycle along the sidewalk—the small child develops for each of these activities a marked degree of interest. He is apt to resent help, and his whole behavior is likely to be marked by an intent persistency which is at the same time a source of amusement to the attending adult, and the despair of any one who tries to get him to do anything else before he is ready to stop.

As he grows older the child shows less intense interest in the things which he has learned to do well; but at any time he may become absorbed either in a different way of performing an old activity or in learning an entirely new one. And in general, throughout the rest of his life, the individual will tend to be "drawn to" those modes of

activity which are habitual to him. James says it is this "force of habit" which permits the work of the world to go on, in that it keeps people content with the lowly and even disagreeable or dangerous walks of life to which they have been since early years accustomed.

It is clear that somehow these acquired ways of action motivate conduct. One is tempted to say that in each case the real motive is the original one which underlay the learning of the habit, and that the habit itself furnishes a mere secondary stimulus to activity. This is a common view among psychologists. It leads not only to search for *the* basic primary or native motives, but to strong emphasis on their importance. For this reason the leading physiological motives of hunger and sex are often considered the central bases of human conduct.

On the other hand, when one considers the complexity and the almost unlimited number of activities which may become basic in behavior, and the great tenacity with which almost any of them may come to be pursued, not in childhood alone but throughout life, it is not so clear that it is only the native motives which are in a helpful sense real or primary. Woodworth has insisted that any activity performed in satisfaction of a drive may itself create a new drive which thereafter operates without any present relation to the original one, so that the subject is interested in the new activity on its own account. He also dwells on the point that any activity for which an individual is specially fitted is likely to be performed with spontaneity and zest, and to furnish its own drive.⁵

Woodworth's conception seems to be a better explanation of the absorbing interests of children than what we may

⁵ WOODWORTH, R. S., *Dynamic Psychology*, *passim* (Columbia Univ. Press, 1916).

call the "original springs doctrine." The only difficulty with it, from the point of view of our definition of motive, is that of explaining what constitutes the stimulating situation in an acquired motive. We can observe that, in the case of a particular subject, when the time comes for the performance of an habitual act, or when the subject is confronted by the stimuli which usually touch it off, he is, if prevented from going on with the activity, restless and moody until it is performed. A two-year-old child, for example, is used to having a bath, with its attendant delights of splashing and drying and patting, just before her supper each day. If, instead, she is taken into the bathroom and merely has her face and hands washed, marked restlessness is likely to ensue, with attempts to get into the tub. At supper there may be a tendency to throw the spoon to the floor and to eat the cereal somewhat savagely.

What are the actual dominant stimuli in such a case? It is not so hard to figure this out when we recall such experiments as those of Feokritova on delayed conditioning. We may assume that because of the previous practice in going through a certain routine, the child is at a certain time "all set" for her bath; that is, there is an actual internal stimulating situation, including a certain state of tonicity of muscles, condition of certain organs and the like — in other words a total "physiological state" which tends to elicit the movements of taking the bath. The sight of the tub and the sound of the water reinforce these stimuli. Hence both the internal "set" and the outer releasing stimuli enter into the motivating situation. Or, even in the absence of the internal stimuli, the outer ones may, on the principle of conditioning, arouse the same responses. Thus, although even invitations to supper sometimes failed to induce the child mentioned above willingly to leave her exciting

play in the sandpile, she would leave at once, even well before the usual time for her bath, at the first request, "Come, take your bath, child!" Saying to herself, "Take baf, shile!" she would trot eagerly into the house and upstairs. Whatever the correct physiological explanation may prove to be, it does seem clearly true that learned habits may function in some way as powerful drives. If this be true, there is no good reason for laying more emphasis on native motives than on these. Presumably a motive is psychologically "real," that is, important as a factor in human personality, to the extent to which it is strong and dominates behavior, not simply because of its origin. Acquired motives may in fact become stronger than those which are clearly native. We need only reflect on such common events as suicides, or on the deeds of martyrs and heroes in all ages, to realize this fact. Even in early childhood acquired motives of all sorts become strong, and by the time a child reaches maturity his behavior is undoubtedly far less dependent upon organic motives found in any animal, than it is on acquired interests, aversions, and purposes which are characteristic of civilized human beings. In other words individual experience, through which the child acquires and supplements the experience of the race, is perhaps more important in his motivation than biological inheritance.

Just as native motivation is changed and supplemented through sensory-motor habits, so of course is it modified through ideas and thinking. Ideas as well as present stimuli may take the place of the original motive in dominating activity, or, as in the case of emotions, may arouse the original motive. Often an idea is merely part of a total motivating stimulus. Again a whole system of ideas, a "habit of thought" which has been acquired by an individual, may

function as a motive in exactly the same way as may a learned sensory-motor habit. The terms impulse, desire, purpose, sentiment, and volition all represent aspects or forms of motivation in which ideas play a rôle; and a somewhat detailed explanation of these terms will show how ideas function in complicating the original motivation of the child.

An impulse may be defined as a conscious tendency, involving a motor set or attitude, to perform a *particular* act. Any one of the many acts which may satisfy a given motive is likely to be called out when the motivating condition occurs, and it is a matter partly of the total stimulating situation, partly of "chance," which particular act is elicited. If the hungry baby sees a piece of zwieback on a table, he may start to creep toward it and, if prevented by an obstacle, such as the side of his pen, he may merely stand leaning on the rail and look at the zwieback. If, instead, he chances to see an orange that has rolled under the davenport, a different motor set will be aroused. The tendency may, on the simplest level, involve merely incipient movements directed toward a present object or situation; or it may involve a "set" aroused in connection with the thought or memory-idea of an object or action which on former occasions relieved the condition.

With the acquisition of speech and of ideas, the child soon comes to remember the acts that have brought satisfaction in the past, so that now when he is hungry, not only do habits of overt response tend to be aroused, but also thoughts of the various things which may be done. When the thought of a particular course of action occurs, the subject is "all set" to do that thing, which probably means that there is a definite postural attitude such as was previously called out in a similar situation just before the action. An

impulse, then, is an urgent conscious readiness to respond overtly in a particular way. The subject may have not only kinæsthetic and other sensations connected with the motor set, but also some conscious processes, perhaps images, which are aspects of the symbolic response standing for the object. It is well to make a clear distinction between the original motivating stimuli, of which the subject may or may not be conscious, and the conscious impulses toward particular acts which the motive may arouse.

Desires differ from impulses in being more lasting and more emotional. When a hungry baby catches sight of a favorite article of food, such as the piece of zwieback, he will at once make movements toward it, creep or walk to it if he can, stretch out his hands, and probably also make little sounds and mouthing movements. We say the child *wants* the zwieback. In this case we may suppose that the subjective situation is very simple; there may be, besides the perception of the object, various sensations and feelings connected with the conditioned responses which are automatically elicited. In the case of a young infant or of an animal it would be going far beyond any known evidence to assume an abstract grasp of the situation, that is, a realization of the need for food, and of the fact that the bread will satisfy that need. If the term "desire" is applied to the rudimentary behavior of the infant, it should be made clear that although the act is doubtless conscious, no ideational activity is necessarily involved. The Freudian application of the term "wish" to motives which are entirely subconscious is a contradiction in terms, and is an example of a word used in much too general a sense for scientific purposes.

Desires are popularly called hopes, wishes, longings, cravings, and the like, according to the intensity and the extent

of the affective responses which are involved. They all are directed to particular objects or situations. Since they involve ideas and emotional (organic) effects which may persist, they may be lasting motives. A hungry child who has recalled the box of chocolates in his mother's room may be persistently active, and active in a direction determined by the thought of the chocolates. That is, this thought will itself arouse relevant responses, such as ideas of going into the room when mother is out, of asking mother for the box, etc. The child is now dominated by a more complex motive than before. He is being stimulated not only by hunger contractions but also by the stimuli involved in the thought of the chocolates. In fact the desire for the chocolates may be looked upon as a separate part-motive within the complex motivating field.

An impulse or a desire leads to a *purpose* when a definite intention or plan of action is formed. Desire may involve merely a positive response to an object or idea which happens to be reinstated, but no specific intention or expectation with regard to it; while purpose involves consciousness of a definite need or lack, together with an idea of an action which may satisfy that need, and a conscious readiness to perform the act. Purpose is therefore more ideational than desire, is more consciously aggressive, and is more likely to issue into action.

The activity of the hungry infant crying in its crib or of the white rat running about for the first time in the maze is not purposive. There may be, for all we know, some dim consciousness of a need or lack, but there can certainly be no idea of the particular activity which will relieve that need. Before such an idea could arise, particular habits leading to satisfaction of the need have to be learned, and, even after this has occurred, the action may

not be purposive, for as we have seen, very complex habits may be built up and fixated without any guidance other than that involved in the directive motivating stimuli and the nature of the total environmental situation in which the responses to the motive take place.

After a habit of satisfying a need has once been acquired, however, a child may be able to recall the solution (habit) ideationally, and hence may form a purpose when the conscious need or lack arises. To illustrate, a lion with a thorn in his foot may simply roar and paw and run, and roar and paw some more, with literally no idea of what to do. The motive, the continuing pain stimuli in the foot, will be purely organic. But a grown man with a thorn in his foot, though he may moan and groan, will also think, and at once, of various things to do. As he decides, for example, that there may be pincers at a nearby farmhouse, this thought may move him to energetic efforts to find a farmhouse and get relief. The activity involved will thus, as both organically and ideationally motivated, be purposive.

If conclusions based on delayed reaction experiments with children are confirmed by further research, children after the first year might be said to have simple purposes. With increase in number of habits and especially in number of ideas, the total amount of purposive behavior will, of course, increase.

Volitions, like purposes, involve both awareness of a need and the adoption of a plan for relieving it. They differ from purposes in that they presuppose preliminary conflict among impulses or desires or both. The boy who is supposed to have bread and milk at four o'clock, but who instead desires the blueberry pie he has seen on the shelf, illustrates the point. As, ever more strongly motivated by

hunger pangs, he continues to think of the pie, related ideas are aroused, some of which conflict with the idea of eating it, that is, arouse incipient responses antagonistic to those which this idea has elicited. It occurs to him that if he eats the pie he will be found out, for his teeth will be stained with the juice. Also, he considers that his mother has probably counted on the pie for dinner, and he has learned not to do things which grieve or disappoint her. Finally, in spite of his longing for the pie, he reluctantly goes to the kitchen and eats the bread and milk. This is an example of voluntary action, or an action which is finally carried out after a number of other possibilities have been considered. Volitions always involve conflict or antagonism between impulses, and the modification of anticipated actions in accordance with a knowledge of their consequences.

Certain complex forms of motivation which are very important in the growth of personality in the child may be called sentiments. This term has been used effectively by the English psychologists Shand and McDougall, but is best defined in the words which Hart used in a somewhat broader sense, as an emotionally toned system of ideas connected with a particular object or situation.⁶

Loyalty to the parents is a sentiment for which there is a nucleus even in infancy, in the conditioned emotional responses toward the parents which the child early acquires, and which soon develop into what we call love. Gradually the average little child learns to think, as a natural result of his experiences, that the parents are extremely wise, extremely good, and also strong and handsome. They can answer every question that he asks them, they always know

⁶ HART, B., *Psychology of Insanity*, pp. 61-63 (Cambridge Univ. Press, 1916).

what is right and wrong, they can do just what they please. These ideas become systematized as the child grows, and tend to be reinstated whenever the parents are thought of. Moreover certain desires and hopes of the child are inextricably bound up with the parents: it is they who provide his food and clothing; they who have promised him that he can travel when he is older; they who will always comfort him when he is hurt. At times the child feels resentment toward his parents, but this is apt to be temporary and not to be closely associated with the normal love-relationship.

The main emotional and ideational responses in a sentiment come to be closely organized, since they are practiced together in varying combinations with reference to a common object (in our example, the parents). Hence any one of these responses, evoked at any time, will tend to arouse the rest of the system. Although not all of the related ideas will be fully aroused, there is bound to be a partial arousal of the symbolic responses, and these may then enter into and modify the total motivating situation affecting the individual's conduct at the time. The emotional components of the system will likewise tend to be aroused, and while the individual child may not be, and probably seldom is, conscious of the emotion as such, the resulting visceral "tensions," released glandular secretions, and the like will remain for a while to play a part in motivation.

Since an emotionally toned system of ideas may be aroused "incipiently," it may dominate behavior although the child is unconscious of the main elements. Suppose another child intimates to a small boy that his father does not have a very high position in the office where he works. Instantly the boy "flares up," tells what important things his father does, and seeks to make the father seem more



important by contrasting him with others. If the remark was particularly pointed, the boy may attack the other boy physically, or during the course of the day may think up ways of showing him his error. Thus, although it is primarily a question of fact whether the father holds a high position or not, the discussion is charged with emotion owing to the powerful sentiment motivating the son. In time this blind devotion will probably change, but irrational or emotional elements will normally remain a part of the sentiment.

Words and objects, such as slogans, flags, and badges, come to stand for special sentiments and tend whenever encountered to arouse the appropriate non-rational responses. These symbols may serve throughout childhood as nuclei for expanding sentiments. In children, and in adults who continue to acquire new ideas and new attitudes, sentiments will continue to change and grow. In others who by training are conditioned against the acceptance of a new idea, the long practised system will continue to function almost unchanged, until in some individuals it may become an almost completely isolated system, or what Hart calls a "logic-tight compartment." If the system does become virtually isolated we call it a "complex," and say that abnormal dissociation exists.

Sentiments leading to negative modes of response of course develop also in the child. An example is the fear of germs which in one little girl became a persistent sentiment. Her mother early told her, on various occasions, about the germs that hide unseen in milk and water and unclean food, dwelling on their horrible appearance and the sickness and disease they might cause. The child was forbidden in the strongest terms to use any dish used by another person, to drink from a common drinking-cup, even

to finish a piece of cake left by her father. As a result she acquired an emotional attitude toward all these acts, and thought much of the awful suffering caused by germs. She did not know that some germs are beneficent, and often felt a fearful wonder that there was no more illness in the family than there was. One day at a state fair, when very very thirsty, she impulsively took a gulp or two from a glass of lemonade put down by a stranger. She was immediately stricken with regret, and feared that she would become very ill. Although as a grown woman she has more accurate information (ideas) about germs and their effects, the results of this early "sentimental" motivation are to be seen in her overscrupulous care in sterilizing her baby's food and his playthings. The difference between such a sentiment and a complex which is expressed in an abnormal hand-washing mania is clearly not great. The difference between normal and abnormal motivation of this sort is not one of kind, but merely of degree.

CHARACTERISTICS OF MOTIVES

Two important general characteristics of motives as they actually operate in children (or adults) may be better understood in the light of the foregoing discussion of the main classes of motives. In the first place, except in the infant who has not yet learned to use symbols or ideas, motives are characteristically complex. Even the simplest physiological motives, such as hunger or pain, will in their domination of behavior act along with specific ideas, desires, plans, intentions, or volitions, according to the nature of the situation and the experience of the child. The complexity in motivating conditions we should expect to increase, in an individual child, in proportion to the extent of his experience, both sensory-motor and ideational.

In the second place, it is clear that in most motivating situations, quite possibly in all, there must be some unconscious or only dimly conscious factors. Any stimuli may elicit behavior without corresponding sensations being present, and this probably holds true particularly of the kinæsthetic and organic stimuli so important in internal motivation. Even when there are sensations they are likely to be vague and unlocalized, so that the subject finds it hard to describe them. Unless he is highly trained in introspection he may find it impossible to tell their source unless the stimulation is intense. The existence of actual hunger contractions may lead to restlessness and inattentiveness in a schoolboy some time before he becomes aware that he is hungry. Similarly, unusually excited and elated behavior may be due to internal sex stimulation, not recognized as such by the boy or girl. Adolescent restlessness, giggling, and general "excitability" are in part the result of sex motivation unconsciously operating.

Even when "ideas" or purposes become a part of a motivating stimulus they may operate subconsciously, *i.e.* the "present items of experience" or symbols which are their core, such as incipient articulations, gestures, or motor sets, may remain and influence behavior long after the subject has ceased consciously to "think about" the objects or situations represented. A decision may thus seem the only clear and right one to make on the basis of evidence at hand, when in reality it represents a response to a dominant preconceived idea which is, through its reinstated symbolic responses, subconsciously motivating the thought. For example, a boy away at school writes home that he must have more money—the food is so poor at his boarding house that he must eat at the Club for the sake of his health. Although the significant motivating stimulus is not the poor

food but the desire to be with certain other boys, the student may be quite sincere in his analysis.

Little children learn only slowly, through much social experience, effectively to conceal their real motives from others. It seems to be still later that they learn to conceal from themselves motives of which once they might have been aware. This means that they gradually learn the responses approved by society in certain types of situations, so that these are the responses which most easily occur. If other more unworthy ones appear they are ignored or indignantly repudiated, or they may never appear as conscious ideas at all. In such a case we can only say that the thinking in a given case is different because of the thinker's previous experiences which have left traces in the organism that are now part of the total stimulating situation.

PROBLEMS ARISING FROM THWARTED MOTIVES

MOTIVES imply problems. Since a motive is a stimulus which continues to affect the organism until something happens which alters the stimulus, an animal faces a problematic situation, objectively speaking, until that something happens. For animals, in general, problems will arise only in connection with the thwarting of organic needs. The same thing holds for infants. For them problems are apt to be less serious than for animals, since the necessary adaptive responses are usually made, and made promptly, by some adult. Most young children are so carefully watched over that, in the case of physiological motives at least, satisfaction is soon possible. But as the child develops the strength and acquires the habits necessary to satisfy his chief needs, social aid is, usually, more and more withdrawn, so that he himself has to make the necessary adjustment.

Perceptual Problems.—The first problems are perceptual, that is, some present physical situation prevents immediate satisfaction of a motive. Carr has pointed out the main reasons for failure to make an immediate adjustment in a perceptual situation. It may be due to a lack of motor ability to satisfy a given motive, a lack which is responsible for many problems of infancy and childhood. Again, environmental means of satisfaction, such as food, may be lacking, or environmental obstructions, such as a stairway, may be present. Finally, adjustment may be delayed because antagonistic tendencies are aroused in the organism at the same time.⁷ The last is illustrated by the case of a small child alternately tending to pat a furry dog, and to shrink and cry because of its quick movements and its barking.

Ideational Problems.—These may arise in exactly the same types of situation as perceptual problems, since the individual is able to anticipate difficulties in advance, and to try out different possible solutions in thought without carrying them out overtly. Moreover many new problems arise, since by means of ideas the number of the child's desires and needs is very greatly increased. Thus as soon as the child begins to use language, his motives multiply as if by magic, and problems are continually encountered.

When incompatible modes of response occur in thought as possible solutions of a difficulty, their clash creates a new problem. The individual who makes first one decision and then another as to what to do, is activated to continual thought of some sort until a line of thinking occurs which is not opposed to others. This clash of thought has a definite physiological basis, we must assume, since ideas as sym-

⁷ This and the following analysis of the reasons for problems and conflicts are based on the treatment of problems in learning and in reasoning, in CARR's *Psychology*, pp. 87, 199-202.

bolic responses tend to reinstate in incipient form the overt behavior for which they stand. In other words they arouse impulses. Ideational motives keep recurring and keep the person disturbed until some action is thought out which ceases to conflict with the tendency aroused by the original motive. We should expect that conflicts in thinking would occur subconsciously also, and as we shall see later, there is excellent evidence that they do in many cases.

When an individual continues to waver between two or more courses of action, it means, of course, that two or more motives are alternately dominant, only one of which can be satisfied. When a problem arises, an impulse to solve it in one way is blocked because another motive is aroused in the total situation. For example, a young girl working as a maid in the home of well-to-do people is continually tempted, by the sight of pretty articles of clothing left carelessly about, to take some for her own use. But no sooner does the idea occur to her than it brings up thoughts of her mother's strict teaching, and also awakens her desire to be true to her religion. Then it occurs to her that these people do not need this clothing, while she really does, and she reflects that it isn't right for some to be cold while others have more to wear than they need. This in turn brings up the thought that she must lie if she takes the things. But that is wrong. And so it goes: as long as the girl is poor and the things are at hand, the situation keeps recurring.

Conflicts. — If the motives arousing the opposing tendencies are about equally balanced, or if additional motivating factors enter in to urge the subject first one way and then the other, as is often the case, then final action may be long deferred, as only one of the mutually antagonistic lines of activity can prevail. Carr has listed the types of mental

conflict which are most likely to arise. Of these, the conflicts between individually and socially motivated impulses are probably most important psychologically. The three-year-old shows the beginning of an important aspect of development when he first hesitates before appropriating the toy of the child next door. A five-year-old girl, sitting next to the author at dinner, betrayed an inner conflict when, asked by her mother to give up one of her cookies, she slowly held out the larger one, then partly drew it back — made, in fact, a number of quick wavering movements before she finally, with an ostentatious gesture, placed the big cooky firmly on the author's plate. "Shall I go out to play, or help Mother who is tired?" "Shall I buy a new toy with this money or give it to the miner's children who haven't enough to eat?" These questions illustrate common childhood problems. At almost any time during childhood, but especially after the beginning of the physiological changes of puberty, problems connected with the sex motive may arise. An acquired and strong tendency to secure satisfaction by handling of the organs is opposed by social teachings which have been so firmly fixated that they furnish strong counter motives. After the child is physiologically mature the chances of sex conflict are greatly increased because there is more intense internal sex motivation.

Other types of conflicting tendencies listed by Carr need be little more than mentioned, for in the case of each it will be clear to the reader how inevitably present and important they are in the mental development of a normal child growing up in civilized society. There is the antagonism between immediate and remote ends. "Shall I spend all my money this week for a pair of embroidered golf-hose, or shall I get a plain pair so that I may buy skates next

week?" There is the conflict between material and ideal values—to cheat and obtain a prize, or to refrain and be true to an ideal. There is the difficulty of deciding between differing future alternatives—to go to a boys' camp in the woods or to spend the summer with the family at the seashore; to take the commercial or the classical course in the high school. More and more acute, with the approach of maturity, becomes, for the intelligent child at least, the clash between old beliefs and new ways of thinking. As Carr points out, there are very likely to exist, in the same person at the same time, differing systems of attitude and belief which may come into opposition. The ethics of the business man in his daily conduct of life often do not accord with his religious beliefs, and if the two systems of thought come into conflict because roused to activity in the same situation, mental adjustment may be very difficult. Such differing systems, of course, have been slowly built up, and in the early growth of a child's personality we may often see their beginnings. In many thoughtful children such conflicts are real and recognized to an extent not realized by an adult who has found a satisfactory rational (or irrational) solution. For instance, children are usually taught to be kind to all living things; yet farm children see chickens killed for dinner, and a favorite calf sold to be killed for veal. Problems thus arising may become acute for some children. Little Peterkin in the poem kept asking what the battle was all about—it seemed to him simply a very wicked thing.

The Importance of Problems in Mental Life.—Most problematic situations provide normal stimulus to interesting activity. There are motor skills to be mastered, outer obstacles to be overcome, school work to be done either with zest or unthinking submission to a routine imposed by

others, and interesting puzzles, mechanical and intellectual, to be solved. The existence of problems, faced as such by the child who has an adequate equipment for attaining satisfactory solutions, is, as we have seen, absolutely essential for the development of normally independent personality. They are basic in sensory-motor learning as they are in thinking. Adults should therefore not only refrain when possible from helping the child who is facing a problem which has arisen naturally; but they should create new ones, when the child is ready for them, not only by implanting new motives, but by pointing out obstacles or difficulties of which the child alone would not have been aware. Only by so doing can they help the young child out of that ego-centric self-confidence which prevents the development of clear understanding and really effective thought and action.

Problems may, however, sometimes become so difficult and serious as to interfere with normal mental development. This may happen because of physical weakness or deformity. For the weak or crippled child the inability to acquire effectively motor skills which are common among children may constitute a serious handicap. The same motives for the learning are present as for other children, but inability adequately to satisfy them may leave the child with a sense of weakness and inferiority which will entail mental crippling also, unless it is wisely dealt with. Equally or even more serious situations may develop where a child is expected either by parents or teachers to do school work or other work which is beyond the limit of his native capacity. Poverty often entails for children a serious lack of the means for satisfying dominant motives — desires for recreation, for beautiful surroundings, for travel, for education. Environmental conditions which may cause serious problems for a child include class, racial, and religious barriers of various

kinds. These social attitudes may stand in the way of the child's attainment of his chief social needs, as the presence of physical obstacles — streams, mountains, desert spaces to be crossed — may hinder the animal from getting food.

Finally, problems may become abnormally difficult because the child is equipped with too strongly fixated antagonistic tendencies, so that instead of normal healthy opposition which is more or less satisfactorily resolved, a state of conflict ensues when an adjustment to a certain situation is demanded, a conflict which, as long as it is unresolved, may keep the child unhealthily absorbed in reactions to one or the other of the dominant motives. Such conflicts are particularly apt to arise between individual desires and the wish to conform to social standards which have been fixated in the child by emotional teaching. When a child continually feels an impulse to do something which he has been taught is shameful and wrong, conflict is to be expected, and will continue until he finds some way of adjusting to the situation which does not conflict with social teachings, or until he works out standards of his own which satisfy him.

Undoubtedly sex conflicts are at present the ones which most commonly become serious. The child whose time and energy is absorbed by trying to think and act rightly about this subject is prevented from giving attention to other problems which are also of importance to him. But conflicts between desires to take up this or that life work, between various views of the world, between opposing religious beliefs, any long-continued mental struggle in fact, may become as serious as sex conflicts.

Serious conflicts are undesirable chiefly because when a strong motive more or less persistently fails of adequate satisfaction, some undesirable or even abnormal type of adjustment is likely to become fixated as an indirect means of

satisfaction. Thus instead of merely creating a stimulating problem for the child, the clash of motives may result in a devitalizing conflict which interferes with normal development.

INDIRECT MEANS OF SATISFYING MOTIVES

It is a very important point, psychologically, that for all except the basic organic needs which must be directly met if an individual life is to continue, a good many indirect means of satisfying a motive are possible. This is true even for the mature sex motive, for although the direct satisfaction afforded by sexual intercourse is necessary for racial survival, it is not necessary for individual survival and may be kept from dominating in various ways. Only a detailed analysis of specific leading human motives, with a discussion of means of satisfying each, could make this point perfectly clear; but a brief description of the leading types of indirect adjustment which are possible may clarify the general situation. Before discussing these indirect means let us recall that a motive is said to be satisfied when something happens which alters or removes the stimulating situation so that the individual is no longer affected by it.

Substitution. — One indirect means of attaining such satisfaction is through the substitution of other motives which, for the time being at least, prove stronger than the original motive and hence dominate the activity of the individual in its place. This principle is illustrated in the common advice to parents, that if they forbid the continuation of an activity in which the child is engaged, or take something away from him, they should try to get him interested, at once, in something else. The four-year-old engaged in pulling up pansies in the garden may be induced instead to play happily in the sandpile. Dr. Healy and his

associates have found through careful follow-up study that in certain cases delinquent boys and girls whose minds were obsessed by sex, have in a surprisingly short time developed healthy interests in normal work and play when placed in foster families where varied and stimulating activities were the rule.⁸ A change from city to farm life or vice versa, a radical change of school or occupation or home environment, has often proved very effective. Usually, of course, it is not merely the physical environment that is altered, but the social environment also; and new ideas, hopes, and plans, new personal pride, enter in as important parts of the changed motivating situations.

Sometimes the method of adjustment by substituting other more desirable activities for those induced by the original motive is thought of as a process of "sublimation," or a drafting of the original energy into new channels. According to this Freudian view, the sex delinquent who becomes absorbed in the work of the farm is actually expending sexual energy in the farm work and the boisterous wrestling and other amusements indulged in there. Such a theory is not at all explicable in terms of our conception of motivation, for a motive is not regarded as a store of energy, or a general reservoir of force, which can be directed through one channel or another. It is instead a definite stimulating situation, and if it ceases to dominate behavior, as in this case, it is only because more powerful stimuli now affect the organism. And as Woodworth says, the new activities which are engaged in soon come to furnish drives (motives) in their own right.

Substitution, although a very important means of dealing with childhood problems, will not apply to all, and is often

⁸ HEALY, W., BRONNER, A. F., BAYLOR, E. M. H., and MURPHY, J. P., *Reconstructing Behavior in Youth*, pp. 40-56 (Knopf, 1929).

of merely partial or temporary value where it does work. The delinquent boy on the farm, for example, while much better adjusted in general, is still bound to be affected by sex stimulation at intervals, and some other sort of satisfaction will have to be made.

Compensation. — When a strong motive cannot be completely satisfied through a "direct attack on the stimulus," the individual may yet obtain partial direct satisfaction by indulging in some related activity which "relieves the tension" somewhat, and makes up to him for the lack of complete fulfillment. To illustrate let us take the case of a high school boy who has fallen in love with a girl. Her family will not permit her to associate with him, and finally take her off on a trip to Europe. There may be partial resolution of the resulting conflict through writing long emotional poems, through romantic daydreams, through taking part in a melodramatic play, through reading love stories, or through dancing and going out with other girls. Each of these ways of acting is directly compensatory in that it provides more or less direct partial response to the sex stimuli which are disturbing the boy. There seems to be little question that in dancing, erotic daydreaming, and other types of "emotional outlet," partial sex responses occur, chiefly internal and visceral. Such responses serve to change the physiological condition, thus altering the motivating stimulus and in some cases inducing relaxation.

Compensatory activity may take many forms. It has often been pointed out that gait and voice and general manner may betray a personal lack of some sort, as when the undersized man walks in an aggressive manner and speaks in deep tones, when the cowardly boy becomes a bully, or the socially timid child is overtalkative. Much of the play of children is compensatory, as will be pointed out in a

later chapter. Children act out in their games things they would like to do but can't — the girl is a mother or a teacher or a great actress, the boy a policeman or a doctor. A good deal of work is compensatory in function.

When either substitute or compensatory behavior of an implicit character is consistently indulged in, it is called *introversion*; that is, the child unconsciously seeks inner imaginary satisfactions to make up for continuing needs. In day and nightdreams, through reading and the movie and the theater, children may enjoy all manner of interesting experiences, and obtain a measure of satisfaction for some of their deepest needs. The forms which *introversion* may take are discussed in some detail in connection with play activities.

Rationalization. — A third indirect means of adjustment to motives is through rationalization. This is thinking which occurs in response to a demand that conduct shall be consistent and logical; and it consists in giving an apparently reasonable but actually distorted explanation of an act already committed or a state of affairs already in existence. Since, as Piaget has shown, the ordinary child feels no special need for logical consistency before the age of eight or so, we shall expect this type of thinking to be rare in young children, to be common in middle childhood, and to be universal in adults. That it is universal in adults any student may discover, with profit to himself, both through introspection and through observation of the thinking of others. Although careful studies of rationalization in children are lacking, observation reveals its presence as an important mechanism in later childhood. An illustration is the case of the boy who, brought up in proud isolation and educated by tutors, was painfully shy and had great difficulty both as child and adult in making social adjustments. When he finally went to a public high school he excelled

in scholarship and, although bitterly lonely, he rationalized by cultivating a worship of solitude. He was entirely unconscious of the real motive which doubtless lay back of his fondness for the poem beginning "There is a rapture in the lonely woods. . ." His desire for companionship and appreciation, thwarted, left him with an aching loneliness which became more endurable through this rationalization.

Rationalizing is illustrated in the "Pollyanna attitude" and the sour grapes device. We may add to these well known types of rationalization another, "the spilt milk delusion." An older child known to the writer frequently made awkward mistakes in her work about the house. Anxious to be efficient, she developed the habit of consoling herself by such thoughts as these "Maybe its just as well that I did spill the milk all over my new dress; it will teach me to be more careful next time." Moreover she applied the same "reasoning" to moral lapses. The habit of rationalizing in such ways is sometimes deliberately fostered in children as a desirably optimistic type of adjustment. But in so far as it leads to the ignoring of important factors in life situations, and thus tends to interfere with the working out of more effective adjustments, it is undesirable and should certainly be discouraged.

The combination of habitual rationaliation with excessive introversion, to the neglect of useful overt accomplishment, actually threatens the mental health of the child. The disappointed spinster school teacher, who, having failed in her personal life and in her work, has taken final refuge in a world of daydreams in which she is the Queen of England, was once a lonely and disappointed child—a child who turned to imaginary satisfaction in her play. As an adolescent girl she explained her isolation as due to a great love of books, and incompatibility with the rude children

of common people; and she attributed her unpopularity at school to jealousy of her superior intellect. Similarly now, as an adult, utilizing unconsciously the same mechanism, does she account for her position in the asylum — she was persecuted by colleagues who were jealous of her, she thinks, and was finally taken to the hospital under false pretenses, as a way of removing a formidable rival.

This case, studied by the writer, represents of course a very unusual outcome. But abnormal adjustments of this sort represent merely exaggerations of normal maladjustment, and there are all degrees of abnormality. Any habit of adjustment which involves the minimizing of important problems or the substitution of imagined for actually needed overt adjustment is likely to result in some degree of weakness in the personality of the child.⁹

Hysteria. — Under a fourth heading, hysterical manifestations, we may classify all those modes of response in which an oppressive situation is avoided by physical symptoms which prevent action. An illustration is the case of the little girl who on her way to school on examination day becomes sick at her stomach, vomits, and has to stay at home for the rest of the day. On a later day she walks to school dreading the arithmetic hour, when she will be asked to go to the blackboard and may be assigned a problem which she does not understand. A feeling of faintness comes over her and finally she is so sick that she has to go home again. Such a child may miss many lessons through illness, and, especially if solicitously watched over by an anxious mother, may become a delicate child and a hypochondriacal adult. The spells of sickness have become fix-

⁹ Particularly clear and suggestive treatments of the topics of fantasy and rationalization are given in HART, *Psychology of Insanity*, which is an excellent and very readable general treatment of functional or psychological abnormalities in general.

ated as an effective solution of any too difficult problem, when the dread of failure constitutes a strong motivating stimulus.

The mistake is often made by physicians and laymen of assuming that in such a case the child consciously adopts this method as a way out. Dr. George K. Pratt, for example, in commenting on a particular case, says that the little girl on the second occasion first *remembers* the vomiting at an earlier time, and then reasons that if she becomes sick now, she will escape the arithmetic hour. It is only after the response has become habitual, according to him, that she forgets its origin, so that it now occurs unconsciously.¹⁰

But though true of some cases, for many, probably most others, this explanation is misleading and false to the facts as disclosed in clinical study. We have here an example of learning occurring on the principle of the conditioned response. There is associated with the original intraorganic stimulus which induced the vomiting, the complex situation of "going-along-the-walk-toward-the-schoolhouse-and-thinking-'I-shall-fail.'" On the second occasion, the mere bodily position and sight of familiar objects along the route, plus the stimulus involved in the thought of failure (for every idea, as a response, involves a stimulus), was sufficient to elicit the response. We should expect the response (including nausea and incipient vomiting) to follow directly upon the stimulus without any intermediary conscious thought.

Study of actual cases of this type indicates that often there is no intermediary thinking; frequently the subject never does realize the true nature of the case. In the examination of a patient who for the sake of understanding the origin of a maladjustment is induced to recall related events, the

¹⁰ PRATT, GEORGE K., *Your Mind and You*, pp. 34-36 (Funk & Wagnalls, 1924).

physical symptoms often occur before the patient remembers the actual situation. Then related images and trains of thought come back. Trained adults who have observed themselves at the time of the first recurrence of a conditioned bodily reaction of this sort report that they become aware of the bodily reaction before they "have any idea of the reason for it." For example, a well-balanced college student who had lately recovered from a severe major operation, suddenly, to his surprise, felt limp and nauseated as he entered a popular quick-lunch room for his breakfast. It was some time before the reason for the reaction occurred to him. The shining enamelled tables of the lunch room were like the tables in the operating room, and served as a substitute stimulus for the ether in eliciting the nausea and bodily relaxation. In children, then, hysterical responses are likely to be fixated unconsciously, and are retained not because of intelligent decision but because, like the chance successes in animal learning, they function to relieve underlying motives in a problematic situation.

The symptoms of almost any organic illness or disability may become fixated as solutions of conflicts in much the same way as indicated in the case of vomiting. The author once observed an attractive young girl who was the oldest girl in a large family, and had worked so incessantly to keep the family going that she had no social life of her own until she became paralyzed and got to the hospital, where she was a favorite patient. The paralysis was easily diagnosed as functional, or psychological in origin. A boy of high school age, known to the author, suffered at times from complete loss of voice. Inquiry disclosed a most difficult family situation, with violent quarrels in which the boy, torn between sympathy for his mother and a sense of duty to his father, was appealed to by both for support.

Physicians were unable to locate any organic causes. A motherless little girl who has spent a good deal of her life in temporary foster homes is now, at eight, nervously anxious about her health, and "is always getting sick spells" so that the doctor, a jolly fatherly person, has to be called, and the foster-mother or matron of the home where she happens to be must give her special attention.

Such hysterical trends as the above very often get their start in childhood and remain in adults as fixed modes of satisfying motives. The milder types are very common, and every physician has to deal with patients whose troubles are really psychological. There is a tendency to dismiss these troubles as "imaginary," and to suspect the patient of shamming. Such an attitude is usually unjustified. The trouble, however caused, is real—conditioned nausea and vomiting is, after all, nausea and vomiting, a set of responses to be reckoned with. Moreover, when we realize the unconscious origin of such conditioning, and consider that the patient's situation was exactly comparable to that of an animal in a trap which simply takes the most available way out, we see how superficial the verdict of shamming may be.

For the student of child psychology the most significant point about these hysterical manifestations when they occur in adults is that they are very likely to have a history extending back into childhood. Therefore the importance of prevention is clear—and this implies providing opportunities for the normally healthy satisfaction of childhood motives. Since these are in many ways different from those of adults, parents must make a special study of children in general, and of their own children in particular, to the end that they may know their most pressing needs. If hysterical trends are already established in a child, the general procedure to be followed is clear, though the details of appli-

cation may in some cases be very difficult. It stands to reason that the earlier the treatment is begun the greater the chance of success, since year by year the maladaptive response becomes more deeply fixated. In order to effect a cure the original motivating need must be discovered, together with the nature of the conditions which gave rise to the hysterical indirect solution. Then there must be therapy through direct reconditioning or reëducation, with new motivation provided or new means utilized for satisfying the old motives.¹¹

Reasoning. — This leads us to a final indirect means of adjustment to thwarted motives, namely, reasoning. If the problem be an intellectual one, such as the problem of finding out how much money it would take to buy two dozen cookies costing three cents each, or of accounting for the origin of the wind; or the necessity of deciding whether to prepare for engineering or for a business career, then reasoning, or the attainment of a solution which answers the question, is of course the adequate and direct means of adjustment. But in case the underlying motive is one which can be fully satisfied only by some special bodily adjustment, either of the skeletal or visceral type or both, then reasoning is only a partial or indirect adjustment.

To illustrate, a child of six begs to be allowed to wear out to play the new dress which her grandmother has sent her. The mother urges her to keep it clean until Sunday, when grandmother is coming to visit. The little girl, to

¹¹ PRESSEY, S. L. and L. C., in *Mental Abnormality and Deficiency*, p. 290, recommend the following treatments of methods of dealing with functional maladjustments in children: BINGHAM, ANNE T., "The Application of Psychiatry to High School Problems," *Mental Hygiene*, 9, 1-27 (1925); DOLL, E. A., and LEATHERMAN, Z. E., "Maladjustment Among College Students," *Jour. Appl. Psychol.*, 8: 390-410 (1924); SAYLES, M. B., and NUDD, H. W., *The Problem Child in School*, p. 287 (Joint Committee on Methods of Preventing Delinquency, 1925). See also cases described by HEALY, W., in *Mental Conflicts and Misconduct* (Little, Brown, 1917).

whom Sunday is a long way off, insists, until her mother explains how hurt the dear grandmother will be, asks if she wants to make her happy, and explains why the dress will not be so pretty after it is washed. Finally the child realizes in imagination the bad consequences of wearing the dress now, and adopts as a solution the plan of waiting until Sunday to please the grandmother. After that there is no longer a problem. If the wish to wear the dress recurs, the child at once recalls her decision, and is satisfied — that is, the decision leads her to turn to other activities so that the wish is not dominant.

It is probably true that the older a child grows the more must he become accustomed to being satisfied with what we may call "ideational adjustments." Some desirable solution is worked out which can be realized later, or only gradually, but meanwhile this symbolic solution prevents undue mental stress or conflict, because, once acquired, it recurs readily as the most natural response to the motivating situation.

Sometimes, often in fact, the result of reasoning about a problematic situation is the conclusion that the underlying motive may never be directly satisfied, and perhaps cannot be. In that case the symbolic adjustment must be the permanent one. The wish on the part of a little girl to be a boy may serve as an example. One young woman known to the author was, as a child, dominated for years by this desire. As a very little girl she thought the possibility was a real one, which could be met by dressing and acting like a boy. When she really understood the physical impossibility, she was much depressed, as her parents, having wanted a boy, were always calling her their little boy, and praising her for her strength. Through the help of her parents she might have been able to face this really difficult

situation rationally. She might have been made to see, on different occasions, that girls may be strong and brave, just as boys can be, and that it isn't the clothes or manner which are most important, but what a person does and how he thinks. The good points of little girls she knew might have been pointed out to her, and, also, certain lacks in boys. The point might have been made that her mother, whom she loved, was once a little girl like herself. Thus a rational decision to be a happy little girl and not worry about the matter might have been reached, as it has been in other cases, and the undesirable motivation thus controlled. In this particular case the parents continued their unfortunate attitude, and the problematic situation became a conflict, greatly influencing the development of the child's personality. Now a student in a coeducational college, she dresses in a masculine way, is loud spoken and aggressive, and is so definitely homosexual in her emotional attachments that she fears (needlessly, the author believes, if proper steps are taken) that a normal married life will be impossible for her.

This case illustrates the great importance of ideational adjustments made after the subject has carried out as complete a rational survey of the situation as possible. Ideational adjustments may provide temporary solution until circumstances are such that they can issue into direct action; or in case that is impossible, they may serve as a permanent means of adjustment. In many cases merely talking the matter over with some one else older or more wise is frequently effective in ending the dominance of a motive, especially for children who so often lack the experience and wisdom necessary for arriving at an adequate and satisfying explanation. But if the reaction is extreme and if the situation is complex, prolonged analysis, with the use of technical aids such as hypnosis and word association tests, may be

necessary. Thinking about a need in a calm complete way involves adjustment to that need: one cannot at the same time be thinking about the reason for it and what it means and what should be done; and also be reacting in a disruptingly emotional way, or daydreaming an imaginary satisfaction, or reacting by distressing physical symptoms, or resting content with a falsely comforting explanation. Reasoning, involving an analysis of the problem and a freely varied attack, is incompatible with any of these modes of response. And reasoning, as an alternative to other adjustments which may weaken or even cripple the personality, is seen to be the ideal type of solution.

Instead of allowing a child to practice unhealthy responses such as rationalizing, daydreaming, or having sick spells, parents should try to see that the growing child forms the habit of seeing problems and of facing them squarely. It is even more important that he acquire the ideal of making that fight to a finish, to use Hart's expression, which is the most likely way of arriving at an adequate satisfaction of the underlying motive.¹²

¹² For a brief treatment of mental hygiene with special reference to the training of children see TAYLOR, W. S., "Mental Hygiene," in *Readings in Abnormal Psychology*, pp. 743-745 (Appleton, 1926). This is accompanied by a valuable list of classified references.

CHAPTER XI

THE NATURE AND FUNCTIONS OF PLAY

A wise man, I say, will recruit and refresh himself with temperate and pleasant meat and drink, yea and with perfumes, the fair prospect of green woods, apparel, music, sports and exercises, stage-plays and the like, which every man may enjoy without any harm to his neighbour. For the human body is compounded of very many parts different of kind, which ever stand in need of new and various nourishment, that the whole body alike may be fit for all actions incident to its kind, and that by consequence the mind may be equally fit for apprehending many things at once.

—SPINOZA.

THE PLAY of young children is very different in appearance from that of adults. The laughing, romping child, tumbling over the lawn, is spontaneous and unrestrained as adults seldom are. On the other hand, in carrying out some complicated task which is play for him, the child may show an eager, serious intentness which is the envy of the average easily tired adult. It is doubtless partly because psychologists inevitably regard the play of the child from the adult point of view, that they have been so hazy and so intellectualistic in statements about its nature and its function. Quite possibly if we could see somewhat more clearly how play does function in the child's life, we could

better understand the zest with which he plays; and we might even learn to recapture some of that zest for ourselves.

CRITERIA OF PLAY

WE SHALL first consider certain criteria which have been proposed to mark off play from work and other types of activity. This may enable us to formulate a working definition of play which will serve as a guide in the discussion of theories.

The Non-utilitarian Character of Play.—From the economic point of view play is distinguished from work by its results. Work furnishes the means of livelihood, while play is activity which is non-utilitarian, which is not performed with reference to practical ends. Thus it is really an economic criterion which has influenced some psychologists to say that play, unlike work, is any activity indulged in "for its own sake," with no ultimate end in view. This criterion is undoubtedly roughly serviceable for practical purposes. For example, it was the one employed by Lehman and Witty when in their investigation of play activities they asked children to check from a list those in which they had engaged "just for fun."¹

The criterion is not, however, accurate and inclusive enough to serve as a definitive psychological criterion. For one thing, it seems to imply a purposive characteristic in children's play which is actually often absent. The child may look back on a week's activity, as he does in filling out the Play Quiz, and judge that certain things were done for fun and others not; but while he is actually playing it is doubtful whether the child has any end in view at all—he is often not purposely amusing himself, but simply respond-

¹ LEHMAN, HARVEY C., and WITTY, PAUL A., *The Psychology of Play Activities* (Barnes, 1927).

ing in a natural way to the total situation. Moreover, some psychologists would wish to classify as play many activities which are indulged in with a particular end in view, such as the making of a pretty Christmas gift for mother or of a salable boat model—much, indeed, of prevocational and vocational activity. A person engaged in a very congenial occupation may say that he is not working at all; this activity is play to him. Again the very same activity which is work for an adult may be play for a child. The six-year-old girl who is permitted to prepare a salad for dinner is performing economically useful activity, and has the aim of producing an edible dish, but to her, we say, it is all play.

It seems that this economic criterion will not enable us to separate play from work, from the point of view of the individual, by considering either the results or the avowed aim of the activity. Let us see if some of the other traditional criteria of play will be more serviceable.

Spontaneity.—It is said that play is response to the child's own suggestions: it is not imposed by others or demanded by the nature of the environmental situation, as is work. The writer heard a child of five singing a little song of her own as she dressed in the morning—

Tra-la-la-bluebirds,
Two bluebirds I have,
Tra-la-la-la-la.

Later in the day the mother insisted that she sing the song for some guests. The child finally sang, but with reluctance. The first performance, according to this criterion, was play, the second work. Yet while spontaneity of this sort seems to be a prominent characteristic of play, it is not always present, since at least the initial stimulus is often supplied by adults, in the form of suggestions both as to when

and what to play. The real trouble with the criterion is that the word spontaneity is too vague to serve as a useful technical term.

Relative Lack of Organization.—A third criterion which has been proposed is that play differs from work in “not conforming to reality” or to a definite pattern, that is, in being more or less unorganized. This statement seems certainly to be true for many kinds of play, such as playing automobile with only a barrel hoop as steering wheel, or telling fairy stories, or skipping about on the lawn. On the other hand, a good many plays are well organized and executed with considerable fidelity to rules or patterns. We usually demand even of an imaginative novel that it be somewhat true to life, either to life as it is lived or to life as it might be lived. Painting and folk dancing, done “just for fun,” are yet under very definite limitations. Even more highly organized are such games as five hundred and football, in which the imaginative element is slight.

Pleasantness.—It has been urged that the outstanding characteristic of play is its pleasantness to the individual. Whether spontaneous or suggested, useless or very useful, variable or highly organized, play activity, according to a statement made by Carr in 1902, is positive, joyous activity. The player has a sense of power and initiative, a feeling of exhilaration.² This criterion seems very useful. It would allow us to classify as play activity which from the economic point of view is work, such as congenial occupational activity and the joyous work of little children; and it would recognize the sort of “play” which, engaged in from duty, is really work. A difficulty arises, however, if we accept the

²CARR, HARVEY A., “The Survival Values of Play,” *Investigations of the Department of Psychology and Education of the University of Colorado*, Vol. I, No. 2, November, 1902.

present-day custom of classifying dreams and works of art as play, for these may certainly be unpleasantly toned.

Freedom from Conflict. — This criterion, suggested by W. S. Taylor in an informal discussion, embodies the central point of the one last named but allows us to think of the matter more objectively. According to this criterion play may be distinguished from work by its *relative freedom from conflict*. Work is characterized subjectively by a feeling of effort and strain owing to the fact that conflicting impulses or desires are involved; but since in play these are absent, it will be relatively smooth running, and usually pleasant.

This criterion seems to hold for play whatever form it takes and in whatever situation it arises. It allows us to classify as play imaginative activity, including dreams and daydreams as well as works of art. In such play activity some unpleasant emotions may be present but if so they harmonize with the total activity which is affording objective satisfaction to the individual, and so they partake of the characteristic feeling of effortless activity. The criterion applies to activity which is work from the economic point of view, but not from that of the individual who finds in the activity pleasant freedom from stress.

It is no objection to this criterion that in many instances of play serious problems or conflicts may exist at the outset. Although these may initiate and, as it were, give direction to the activity, the play itself will be characterized by the absence of conflict. This does not mean that no problems will arise in the course of the play. On the contrary it is generally recognized that a certain amount of unfamiliarity, difficulty, or opposition is a necessary condition of zestful activity. In fact, artificial difficulties are often purposely introduced into games in the form of physical obstacles (such

as hurdles), or various kinds of conventions and rules. Morgan found that subjects engaged in a simple task requiring speed worked on the whole even faster when various distracting noises were introduced; and although they put forth greater effort than under quiet conditions (as shown by objective measurements), they reported that they enjoyed the activity. The only ones who found the work unpleasant under noisy conditions were two who did slower work.³ This suggests that it is the degree to which a motive is satisfied, not the amount of effort put forth, which makes play of an activity.

Thus the relatively slight and readily surmountable hindrances which occur in the course of play do not give rise to conflicts and an unpleasant sense of effort, but on the contrary afford stimuli to vigorous and enjoyable activity. In a good deal of play there may not even be a serious problem at the start; so that the satisfying activity takes place freely and smoothly. This is the case, for example, when a healthy baby, after its supper, runs and shouts about the house, happy and laughing; or when the older child, released from school, skips and sings along the street.

The Highly Motivated Character of Play.—The writer's analysis of the preceding criterion suggested to her the need for taking into account one feature of play which none of the criteria heretofore presented recognize, namely, its definitely motivated character. A good deal of human behavior which is free from conflict is not play. This point finds illustration in most reflex behavior such as turning the eyes toward a passing light or the head toward a momentary sound. It seems also that a great deal of well automatized smooth-running habitual activity is not, prop-

³ MORGAN, JOHN J. B., "The Overcoming of Distraction and Other Resistances, pp. 46-47, and *passim* (*Columbia Univ. Contr. to Phil. and Psychol.*, Vol. XXIV, No. 4, Science Press, 1916).

erly speaking, play — for example, going through the process of dressing in the morning, or mechanically eating breakfast afterward, or performing any of the thousand and one routine actions of the day. Such activities become play, we would suggest, only if some new general motive is introduced or if some pleasing distractions or delays occur which, by more highly motivating the ongoing act, energize it and permit harmonious and sometimes prolonged satisfying activity.

The little girl whose daily and not unpleasant task it is to dust the living room may find it becoming real play if she is encouraged to take pleasure in such things as the contrast of a copper bowl with a dark shining table top; or if a more general motive is introduced by suggesting that she arrange the room in such a way that her mother will enjoy it later. The complication of the situation by new appreciations and anticipations gives the activity a more highly motivated character and permits richer satisfaction. To bolt a meal in haste or to eat it mechanically is not play, though the activity may be pleasurable — but to go through the same biologically necessary operations stimulated by bright flowers and attractively garnished food, and particularly by the conversation of welcome friends, is play. In order to be called play, activity must therefore be not only motivated, but, we might say, highly motivated.

DEFINITION OF PLAY

ALL OF the play criteria which we have discussed are suggestive and helpful in one way or another, but the only ones which do not have the disadvantages of being either too vague or too limited in application seem to be the last two, which emphasize respectively the freedom of play from conflict, and its highly motivated character. On the basis of

our discussion of criteria we may now attempt a definition. Briefly stated, play may be said to be highly motivated activity which, as free from conflicts, is usually, though not always, pleasurable.

The proposed conception of play will exclude such vital reflex and instinctive activities as starting at a sound and eating and digesting food. It will also exclude much learning, both sensory-motor and ideational, which goes on as a series of responses in a continuously difficult or "conflictful" attack on a problematic situation, as well as the automatic performance of habits once acquired. Thus school work and perhaps most activity which is classified as work from the economic point of view will be excluded; and yet all that "work" which the individual does in a relatively effortless and joyous way will be included. This definition will include, moreover, highly organized games as well as simpler and less directed forms of activity. It will meet the chief objection to the "pleasure" criterion in that it will include some activity which is, subjectively speaking, unpleasant. Finally, it applies not only to overt play, but equally well to imaginal or implicit play.

Woodworth has effectively called attention to the point that most of the overt play of children is accompanied by imagination; that is, the plan for the play is thought out in advance, and as objects are manipulated, the meanings are thought of: when a boy arranges chairs to form a train, with a rocking-chair as the engine, each act has its imaginal interpretation. When we come to story-telling or day-dreaming, we have the same sort of process, carried, however, a step further. In this case "the objects manipulated are simply thought of."⁴ Thus it is clear that any imaginal

⁴ WOODWORTH, ROBERT S., *Psychology: A Study of Mental Life*, chap. xix (Holt, 1921).

activity which is highly motivated and yet free from conflict is play, and that to attempt to draw any sharp logical line between the two types of play, overt and implicit, would be to make a misleading distinction.

Having finally arrived at a working conception of what play is, we may now go on to a discussion of theories which attempt to explain why children play, and the significance of play in relation to other types of activity. Certain famous theories which we shall take up have been formulated with reference to overt play only, but the student will see that they might as well be applied also to implicit play.

THEORIES OF PLAY

"The Surplus Energy Theory."—Psychologists have been accustomed to criticize what is referred to as "the surplus energy theory" of play; but Lehman and Witty have shown that this theory is largely a construct of the critics. It has been called the Schiller-Spencer theory, as if propounded independently by the poet Schiller and by Herbert Spencer. But, it seems, neither of these men suggested that the concept of surplus energy would explain all play—they simply made incidental use of the term in the course of broader treatments. Schiller in a discussion of æsthetics said, "The animal *works* when a privation is the motor of its activity, and it *plays* when the plenitude of force is this motor, when an exuberant life is incited to action." In another place he wrote, "The imagination, like the bodily organs, has in man its free movement and its material play . . . in which . . . it simply takes pleasure in its arbitrary power, and in the absence of all hindrance."⁵ While such remarks as these are highly suggestive, they do not con-

⁵ SCHILLER, FRIEDRICH, *Essays, Æsthetical and philosophical*, pp. 112 ff. (Bell, London, 1875. Quoted by LEHMAN and WITTY, *op. cit.*, chap. ii).

stitute a theory of play and should not be criticized as such. Even if Schiller had intended these remarks as a surplus energy theory, the objection that sick and tired children play would hardly be in point; certainly they do have some surplus energy, or they couldn't play. Children, constantly stimulated and with everything done for them, naturally engage in activities not so definitely prescribed as those of adults.

Neither should a "surplus energy theory" be attributed to Herbert Spencer. He gives an extended, critical, and stimulating analysis of play, mentioning "surplus energy" only incidentally as but one of many factors in a very complex type of activity.⁶ It is therefore an error to speak of the surplus energy theory as if it were a systematic formulation, an error to attribute it to Spencer, and unfair to criticize it as superficial and too simple.

The Preparation Theory. — Groos did set forth elaborately a systematic theory of play. In two books, *The Play of Animals* and *The Play of Man*, he presented a wealth of suggestive material on this subject.⁷ He thought that play can be explained as representing instinctive preparation in the young for serious adult activities: the kitten in playing with spools prepares for mouse-catching; the little girl playing with dolls is being drilled by Nature in the tasks of motherhood.

Groos's whole thesis rests on the assumption that play in its various forms is an instinct, or hereditary. But such a classification of this many-sided, changing activity is inac-

⁶ SPENCER, HERBERT, *Principles of Psychology*, chap. ix, "Æsthetic Sentiments," pp. 627-648 (Appleton, 1896).

⁷ GROOS, KARL, *The Play of Animals* (transl. by Elizabeth L. Baldwin), xxvi and 341 (Appleton, 1898); *The Play of Man* (transl. by Elizabeth L. Baldwin), p. 412 (Appleton, 1901). Wherever possible students should consult the original works. The two books by Groos, although based on psychological theories no longer generally held, are scholarly, interesting, and stimulating.

ceptable to modern psychology. Play may indeed represent a valuable preparation for future activities, but not *instinctive* preparation. It has been pointed out that the plays of children vary from age to age and decade to decade in accordance with social needs and social traditions. At one time drill in taking accurate aim with bow and arrow provided valuable preparation for life; to-day it does not. Many inherited ways of acting are involved in play, such as laughing, jumping, stretching, and the like; but the form of play, its pattern or organization, seems clearly to be learned. Inadequate as is this brief mention of Groos's work, it may suggest that he succeeded, not in explaining play by a well-rounded theory, but in setting forth in a very interesting way its great social value.

The Recapitulation Theory.—This famous theory of G. Stanley Hall's may best be set forth by direct quotation: "True play . . . exercises many atavistic and rudimentary functions, a number of which will abort before maturity, but which live themselves out in play like the tadpole's tail, that must be both developed and used as a stimulus to the growth of legs which will otherwise never mature. I regard play as the motor habits and spirit of the past of the race, persisting in the present as rudimentary functions sometimes of and always akin to rudimentary organs. The best index and guide to the stated activities of adults in past ages is found in the instinctive, untaught, and non-imitative plays of children which are the most spontaneous and exact expressions of their motor needs. The young grow up into the same forms of motor activity, as did generations that have long preceded them, only to a limited extent, and if the form of every human occupation were to change to-day, play would be unaffected save in some of its superficial imitative forms. It would develop the motor capacities, im-

pulses, and fundamental forms of our past heritage. . . In play every mood and movement is instinct with heredity. Thus we rehearse the activities of our life work in summative and adumbrated ways. . . Thus stage by stage we reenact their lives. Once in the phylon many of these activities were elaborated in the life and death struggle for existence. Now the elements and combinations oldest in the muscle history of the race are re-presented earliest in the individual, and those later follow in order. This is why the heart of youth goes out into play as into nothing else, as if in it man remembered a lost paradise.”⁸

Hall discusses in detail the chief implications of the recapitulation theory. In particular he elaborates the point that “rudimentary play functions” must be exercised to provide for normal future growth, saying that “the physical activities must be played off, each in its own time.” Thus he emphasizes what he calls the cathartic value of play. For example, he advocates not only fist-fighting among boys, but all kinds of military games and military training, on the assumption that if the fighting instinct is not thus expressed in play, it may “crop up in worse forms later” and the boy may suffer deep spiritual injury. “Better . . . an occasional nose dented by a fist, a broken bone, a rapier-scarred face, or even the sacrifice of an occasional life of our best academic youth, than stagnation . . . and moral corruption.”⁹

In spite of its air of truth and reality and the heroic ring of Hall’s sentences, his famous theory of play, after twenty-five years of discussion and investigation, is now no longer accepted by psychologists. It may seem a waste of time, since the theory is now so thoroughly discredited, to discuss

⁸ HALL, G. STANLEY, *Adolescence*, Vol. I, pp. 202–203 (Appleton, 1904).

⁹ *Ibid.*, *op. cit.*, Vol. I, p. 221.

its merits as applied to play. Yet notwithstanding repudiation, the theory still has much influence. It is reflected in many current books on child psychology and recreation, and consciously or unconsciously planners of curricula and teachers in the schools, as well as ordinary parents, have been influenced by Hall's views. The idea of catharsis which is implicit in the theory has many practical exponents. It is still necessary therefore to show why this important theory has been generally rejected by psychologists.

The chief line of evidence against Hall's position is derived from the facts of embryology. We saw in chapter four that while there is indeed physical recapitulation, it all takes place, so far as known, in the period of embryonic growth.

In the second place, the evidence contributed by Hall and his students in support of the theory as applied to play has been found unsatisfactory. The general method used was to find some measure of children's interests in various kinds of play at different ages, on the assumption that if it could be shown that a certain definite interest was strong at a particular age, that would be evidence that a corresponding instinct was then ripe. For example, Hall and Ellis found that more girls played with dolls at eight and nine than at any other age, and assumed that therefore this is the time of "nascence" of the maternal instinct. The dominance of savage instincts between about seven and nine is shown, according to a study by Croswell, in the fact that his curves indicating the percentage of boys of various ages participating in games of chase "rise from eleven per cent in boys of six to nineteen per cent at nine, but soon after decline, and at sixteen have fallen to less than four per cent."¹⁰

¹⁰ The studies of Hall and Ellis and of Croswell are cited in the volume above referred to, pp. 208-210.

Now we must question the underlying assumption of this work. Although physical growth in general must have some part in determining children's interests, the assumption that they are due fundamentally to the "maturing of brain centers" is, as we found in the chapter on native responses, quite unjustifiable. Social tradition, the influence of companions, the existence or non-existence of special facilities for certain kinds of play — such factors as these furnish more adequate explanations than the concept of the ripening of instincts.

Moreover, these investigators did not even furnish clear evidence for the incidence of particularly strong interests at special periods of childhood. The results were often conflicting; the curves showing play interests at different ages were not so sharply peaked as the theory would demand; and finally the classifications of plays adopted by the investigators were so loose as to invite such interpretation of the results as would support the theory.

A third line of evidence against the recapitulation theory is furnished by the work of more recent students, especially of Lehman and Witty. They used the method of checking from a printed list in preference to the questionnaire method employed by Hall and his followers, and conducted extensive investigations, the results of which in point after point contradict the conclusions of the earlier workers. "In the case of children old enough to read, the plan employed was to place before each individual a comprehensive list of two hundred play activities, having him check each one in which he had engaged of his own volition during the week preceding the date of the investigation. . . In the last of a series of six investigations the children were asked to identify and indicate those activities in which they had participated alone." For pupils of the lower grades who could not read so well, the teachers, who administered the quiz, read aloud

to their pupils the list of activities. Altogether about 10,000 children, mostly of Kansas and Missouri, were tested. The lists were checked three different times during the year, in order that seasonal differences might be taken into account.¹¹

An objection to the method of the play quiz is that children, especially the younger ones, may give inaccurate reports — may forget some activities in which they have engaged, and add others. That such inaccuracy is present there is no doubt, but the shortness of the interval (one week), and the fact that the method of recognition is used rather than the more difficult one of recall would tend to minimize this source of error. Moreover in the case of so many subjects such inaccuracies might be expected to “cancel themselves out,” and the consistency of the results is evidence that this occurs. A more fundamental disadvantage of the method is that there is no provision for definition or analysis of specific plays listed, so that in some instances the children may not understand just what activities are included. On the whole, however, most of the items are definite and specific, and of them this objection would not hold.

The results furnish no evidence that specific play interests characterize definite ages. Rather is there evidence of a gradual decline of interest in all of the plays and games from the earlier years up to the age of eighteen. One way of treating the results was to make for each of the two hundred play activities listed a separate curve showing the percentage of children of each age who indicated that they had engaged in that activity during the week. Figure 19, presenting the curve for skipping rope, reveals a situation which the authors say is typical of that found for most of the two

¹¹ LEHMAN and WITTY, *op. cit.*, pp. 35-43.

hundred play activities. Certainly there is no evidence here for age-periodicity in play.

Certain evidence gained in this investigation militates against Hall's belief that while from seven to twelve games are almost exclusively individualistic and competitive, more social forms of play are characteristic of early adolescence.¹²

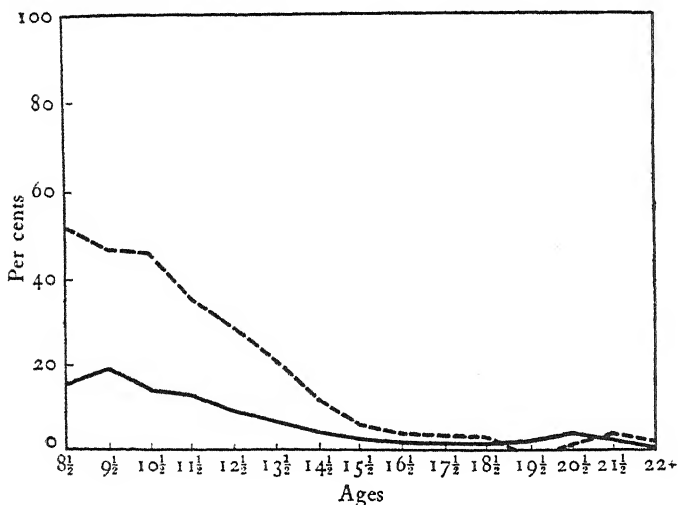


Fig. 19. PERCENTAGES OF BOYS AND GIRLS WHO INDICATED THAT THEY HAD JUMPED OR SKIPPED ROPE DURING THE COURSE OF A WEEK

Average of findings from three separate investigations. From *The Psychology of Play Activities*, by Lehman and Witty. (Copyright, 1927, by A. S. Barnes and Company. Used by permission.)

Lehman and Witty arrived at an "index of social participation" for each child by calculating what percentage of the total activities engaged in during the preceding week, were social activities, that is, plays in which the child indicated that he had participated with others. In Fig. 20 is shown the average index of social participation from ages seven and

¹² HALL, G. STANLEY, *op. cit.*, pp. 209-210.

one-half to nineteen and one-half. If anything, the plays of later years tend to be somewhat less social in character than those of the earlier years, in so far as the social character of play can be measured by such a criterion.

In a chapter on "Variables Which Influence Play," these investigators showed that play interests varied and changed

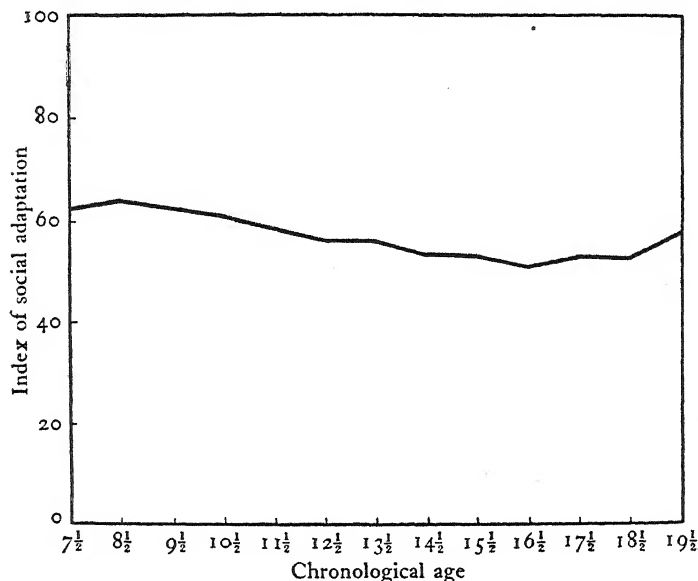


Fig. 20. RELATIONSHIP BETWEEN INDEX OF SOCIAL PARTICIPATION AND CHRONOLOGICAL AGE

From *The Psychology of Play Activities*, by Lehman and Witty. (Copyright, 1927, by A. S. Barnes and Company. Used by permission.)

according to locality, season, sex, material equipment at hand, prevailing fashions in play, and the like. For example, their results indicated that many more town boys than rural boys played marbles; and that during one week in a certain town the per cent of white boys playing marbles was less than half the per cent of colored boys who engaged

in this activity. Very many more boys played basket-ball in Lawrence, Kansas, a university town, than in other towns of the state.

The authors attempted to get an indication of change in play interests from one decade to another by comparing the results of an investigation of collecting made by Burk in 1900, with the responses to their item, "collecting stamps, birds' eggs, and so on." While ninety per cent of Burk's subjects were actively making collections, at no age level did more than fifteen per cent of the subjects in the present investigation check the "collecting" item. But this is one of the less well defined items, and as Whitley points out, the phrasing "collecting stamps, birds' eggs, and so on" is likely to focus the child's attention on these two things, to the neglect of other things which he may be collecting; and it is also quite possible that the word "collection" may imply to many children a more formal array of objects than is really meant. Using also the words "treasures" and "keep-sakes," and having the children not only check from a long list of objects but tell the names of other things they liked to keep, Whitley found that among 4446 eastern children, at no age were fewer than eighty-four per cent interested in some sort or other of collecting activity.¹³ Whitley's interesting study shows how greatly the character of the results is influenced by the method used, makes it clear that Lehman and Witty's use of this particular item is inadequate, and demonstrates that they were not justified in making direct comparisons between their results and Burk's. The study is not, however, a refutation of the general argument of these authors as to variability in play interests — an argument which is based on the study of a large number of

¹³ WHITLEY, MARY T., "Children's Interest in Collecting," *Jour. Educ. Psychol.*, 20: 249-261 (1929).

items most of which are perfectly clear and definite. It does point to the desirability of investigating changes in interests from one decade to another by the administration of identical techniques.

We thus see that on the whole the results of Lehman and Witty furnish strong evidence against the recapitulation theory. Even if Hall's assumption that interest corresponds to instinct were correct, these results would controvert the theory by showing not only that specific play interests do not tend toward concentration at particular ages, but also that these interests vary considerably according to temporal and local conditions.

The Relaxation Theory. — According to this theory as stated by one of its most prominent recent exponents, Patrick, "those mental powers upon which advancing civilization depends, especially voluntary and sustained attention, concentration, analysis, and abstraction, are undeveloped in the child and subject to rapid fatigue in the adult. Hence the child's activities and the play activities of the adult tend always to take the form of old racial pursuits." Physiologically some brain centers or tracts are assumed to be put under severe strain in modern life, and these must be relieved by the exercise of other racially older and less fatiguable tracts, in activity which we call play or sport, of which "the word relaxation would be a more exact description." Now, "the brain tracts associated with the above mentioned forms of mental activity are undeveloped in the child, as they are in early man, so that we may say with considerable truth not that the child *ought not* to work, but that he cannot work."¹⁴

For two chief reasons this interesting theory of Patrick's

¹⁴ PATRICK, G. T. W., *The Psychology of Relaxation*, pp. 48-49, 53 (Houghton Mifflin, 1916).

is inadequate. In the first place, there is no neurological evidence that certain higher brain tracts or centers are undeveloped in primitive adult man, although we do know that medullation of cerebral neurones is not completed in the child and continues into adult life. Moreover, evidence about neural fatigue is conflicting. Nerve fibers seem practically unfatiguable, and we are not sure to what extent cell bodies fatigue. Why "centers" fatigue, and what is the relative fatiguability of various types, we do not know.¹⁵ In the second place, the theory assumes the inheritance of racial habits, for which we have seen there is no good evidence. But while for these reasons the theory as stated by Patrick is not entirely adequate, it remains true that the author, like Groos, has called attention to a very important value of play. Those who engage continuously in one kind of activity undoubtedly become fatigued, and need, in order to regain a favorable total organic condition, to indulge occasionally in other kinds which exercise different parts of the organism. Patrick's book is very suggestive and convincing in its emphasis on the great need for relaxation in adults as well as in children.

The Compensatory Theory. — This theory, anticipated by Herbert Spencer and others and touched on recently by M. J. Reaney,¹⁶ was first clearly set forth in 1920 by E. S. Robinson and more critically stated by him in 1923.¹⁷ According to the theory the play of children represents essentially a mode of resolution of conflicts which grow out of the conditions of child life. "The child, living in intimate

¹⁵ HOWELL, W. H., *Textbook of Physiology*, 8th ed., 1922, pp. 117-119 (Saunders, 1922).

¹⁶ REANEY, M. J., "The Psychology of the Organized Group Game," *Brit. J. Psychol., Monog. Sup.*, 4, p. 76 (1916).

¹⁷ ROBINSON, E. S., "The Compensatory Function of Make-Believe Play," *Psychol. Rev.*, 27: 429-439 (1920); also "A Concept of Compensation and Its Psychological Setting," *Jour. Abn. Psychol.*, 17: 383-394 (1923).

contact with a world of adults (often too with a world of fiction), develops impulses to behave in manners which he is taught by his parents and by more concrete agencies are not desirable or possible for him. The conflicts thus created remain until they are finally resolved by changes incident upon his own growth and by changes which practical experience creates in his own impulsive nature. But while he is a child, certain conflicts and certain compensatory resolutions of those conflicts remain as integral parts of his child character." The conflict is always between two impulses — one to do the impossible or forbidden thing, the other to obey the parents or "behave."

Robinson's conception of compensation seems to be essentially the one we set forth in the last chapter. In saying that the compensatory play behavior is such as to "express in modified form all of the essential elements of the conflict," he implies that the activity in some way affords at least partial biologically direct satisfaction of the motive at the basis of the conflict. In the case of the boy who plays with toy soldiers because he cannot go to the front, we have as the stimulus a desire to fight, the direct "adequate" responses to which would include marching, shooting, becoming very angry, and the like. In his play the boy actually does some of these things, in a partial way; he is vindictive toward the tin soldiers, swaggers and shouts and waves flags, in a way which corresponds to his conception of what going to the front would be like. In the last chapter we suggested why it is that in the case of a person suffering from thwarted love impulses, related behavior such as reading love stories or dancing is more directly satisfying than substitute activities.

Further illustrations from children's play will indicate how pervasive and important compensatory activity is in

children. The five-year-old is always wanting to lift the baby, to rock him, and to play with him. Since these impulses if carried out might have serious consequences, they are consistently nipped in the bud by the parents. To prevent the wailing which might otherwise ensue, wise parents provide all manner of soft cuddly animals and dolls for little children, and if these squeak or talk or move about when wound up, so much the better. On them little children can lavish their affection freely and have good fun without unpleasant frustration.

Children old enough to begin to "help Mother" or "work with Daddy" constantly find their impulses to engage in adult occupations almost completely blocked. They are encouraged to want to help, yet are permitted to do but very little, and that only rarely — as a rule, when the busy parent has plenty of time. Lehman and Witty found that primary school children showed great interest in helping parents. Each of about 1700 children was asked to name the five things that he liked best to do at home, and the five things at school which he liked best to do. A large number of the children reported that they liked to help someone in the performance of certain tasks.

When we consider the extent to which the desire for such activities as those listed must necessarily be thwarted in the early years, we can easily see how directly compensatory much of the common childish imitation of adult activities must be. We can understand the intense interest often shown by little girls in playing with toy tea sets, brooms, washtubs and cookstoves; and by little boys in snow shovels, toy engines, electrical devices, toy agricultural implements and tools. The popularity of mud pies, of home-made paper money, of doll carriages and of miniature fire trucks is at the same time a reflection of the social environ-

ment of the child and an indication of the extent to which his desires to participate in the activities of adult society are checked.

While for all children such common play activities as the above must serve a compensatory function, certain special kinds of play undoubtedly have additional compensatory value for particular individuals or groups, according to the motivation which is peculiar to them. For example, Lehman and Witty believe they have shown by their play quiz as given to children of grade four and above, that playing school may serve as a compensation for a feeling of intellectual inferiority associated with poor progress in school. They found that among over five hundred and forty-three colored children between the ages of eight and eighteen, playing school was very commonly reported, as it was by the white children examined. But the negro children played school much more frequently than the white children, and the girls of each race more frequently than the boys of that race. The following table furnishes a numerical statement of the situation:

Percentages of White and of Negro Boys and Girls who indicated that they had been "Playing School" during the course of one week. January, 1926. *

Ages	Negro Girls	White Girls	Negro Boys	White Boys
8½	81	57	41	13
9½	61	41	40	9
10½	60	43	29	11
11½	47	35	21	5
12½	41	19	15	3
13½	32	9	8	3
14½	21	6	2	0
15½	21	1	5	0

*From *The Psychology of Play Activities*, by LEHMAN and WITTY. (Copyright, 1927, by A. S. Barnes and Company. Used by permission.)

In interpreting these results, Lehman and Witty call attention to the findings of Witty and Decker that negro children were educationally retarded in all subjects at all ages as compared with white children. They say that negro children are doubtless aware of this inferiority from an early age, and suggest that "negro children engage in playing school more commonly than white children because this activity symbolizes to them knowledge, power, and prestige, which they are unable to achieve in the world of actuality." The greater participation in this activity of girls as compared with boys is explained by the authors as due simply to greater environmental restrictions.¹⁸

Lehman and Witty found also that many children reported having gone to church during the past week "just because they wanted to go," and that negro children attended church more frequently than white children. Their tables show that the negro children indulge very much more frequently in "playing church" than the white children. The same situation is revealed in figures showing percentages of boys and girls who had "played Sunday school" during the week. According to Lehman and Witty, it is reasonable to suppose that in some instances the negro's religion is a compensatory mechanism having the same origin as the daydream. While the factors in any such play must be many, and must vary with the player, it seems indeed reasonable to suppose that compensation is an important part of the explanation. Writers have often pointed out that the negro spirituals which most feelingly emphasize the splendors of heaven and the kindness of God were the product of slaves. Not only in actual church attendance, then, but also in plays which reproduce religious ceremonies, compensatory factors seem to be present.

¹⁸ LEHMAN and WITTY, *op. cit.*, chap. ix.

Another type of overt play, namely, games and plays of adventure, demands mention from the point of view of the compensatory theory. It is a fact that human beings like to be stirred, to be thrilled, to feel suspense, even to be in danger. Such emotional responses occur easily, and if there are no serious personal consequences they are enjoyed in process and in retrospect. It was well for the race that the earliest human beings had this zest for adventure, for thrilling and dangerous physical activities were necessary for its survival. Civilized men have the same delight in adventure, and even if they have never faced actually dangerous situations, they often long to. This longing can be explained as the result, among other factors, of powerful social traditions, tales of strength and heroism which have gained for the doers the applause and the love of multitudes. There is little chance or little need in modern life for strenuous physical adventure. But the urge persists, fostered in every generation by stories of the past and by the incitement of outstanding heroes of the present.

How can this motive be satisfied? One way is by reading, seeing movies, dreaming. Another is by strenuous overt play in which there is thrill, suspense, the illusion of danger—but always (or nearly always!) safety in the end. All manner of plays and games may help to satisfy the “urge for adventure,” from climbing over the dangerously high poultry house in early childhood, to shooting the chutes or riding on a scenic railway in youth; from venturing clear to the grocery store across the railway tracks in infancy, to taking part in a polar expedition as an adult. Playing Indian, cowboy, or soldier, fighting with snowballs, going off with a scant store of provisions to seek an undiscovered island—all these are common means of expressing in overt play urges for specific types of adventure.

It is apparent that much of the play serving to compensate the child for lack of real adventure could easily shade over into delinquency, and also that the child actor himself might be perfectly innocent of any evil intentions. Jane Addams has argued on a basis of a rich experience with individual cases, that many instances of running away, stealing rides on trains, setting fires, and other such activities may be best understood as essentially natural responses of youth starved for adventure.¹⁹ With the thirst for adventure as strong as it is in childhood and youth, and opportunities for its actual realization so few, the great social importance of providing plenty of exciting play, both overt and imaginal, is strikingly apparent.

Concrete compensatory play shades off into imaginal play activities. In much of the overt play which we have cited as illustrations of compensation, imaginal factors are, of course, important. Play which is predominantly or wholly imaginal we may call fantasy.

It is clear that in imaginal play children have a quick and easy means of compensating for thwarted motives; and easy to see that the theory of Robinson is particularly applicable to pleasant imaginings, whether in dramatic plays or stories, in dreams, or in daydreams. It is not at first sight so easy to see how the theory applies to unpleasant imaginal activity, but analysis of such activity indicates that it does. We may cite an unpleasant dream as an illustration.

A small boy dreams that his little sister is killed by an automobile, and that the whole family is overcome by grief. This boy has been secretly jealous of the little sister ever since her arrival, and has felt that his adored mother no longer loves him. As long as he thinks of the sister as liv-

¹⁹ ADDAMS, JANE, *The Spirit of Youth and the City Streets*, chap. iii, "The Quest for Adventure" (Macmillan, 1910).

ing and happy, the jealousy motive is dominant and creates a serious problem, since any impulses against the sister are checked in his rational thought. But when he is thinking of her as dead the mental conflict is less serious, since this sort of thinking actually accords with certain subconscious impulses, and permits unimpeded thoughts of mother love as now directed wholly toward him. Thus the dream activity, although subjectively unpleasant, does afford a measure of objective satisfaction of a desire, perhaps subconscious, to have his sister out of the way, and hence comes with all the effortlessness of pleasant play activity.

The same statement is often true of morbid daydreams in which through imaginings of suffering or death the child gets the attention, sympathy, and love which he craves in actual life but does not get. The illustration suggests also how it may be possible to regard as in part compensatory the reading of sad or tragic literature, and other forms of artistic enjoyment.

In the compensatory theory of play we see the influence of the Freudians, and particularly of Adler. The theory has been seized upon by psychologists as very important. It seems to be in fact the only theory of those so far presented which is both psychological (as distinct from economic or hygienic) and, to a very considerable extent, explanatory. It seems to give a satisfactory explanation of many particular forms of children's play, a task which was attempted but without success by Groos, Hall, and Patrick. Robinson's theory, moreover, does not assume the existence of particular instincts, but only of many impulses to action which may be based on any of the innumerable human motives, native or acquired. Finally, this theory is particularly successful in its illumination of the nature of fantasy.

In spite of these excellent features, certain objections to

the theory may be urged. In the first place, some psychologists do not think the term compensation can usefully be applied to the broad range of common and normal childhood activities which Robinson has called compensatory. These critics would prefer to reserve the term for application to that behavior which represents an extreme or exaggerated reaction to a thwarted motive, behavior which thus more than makes up for a lack, or provides more "satisfaction" than is objectively necessary or socially desirable. A common example of compensation taken in this sense is the swaggering manner or pompous speech of the person who really lacks self-confidence, who is, or who feels himself to be, inferior to those with whom he associates.

As applied to play, this use of the term compensation might be illustrated by the favorite play activities of the bully who is really a weak or timid child — and who covers up his lack, unconsciously, by indulgence in such rough sports as mercilessly snowballing little girls, or picking fights whenever possible, often with boys younger or less strong than himself. It is quite possible that such diverse forms of play as the rough treatment of the "tenderfoot" in the old West, the practical jokes played on the "city kid" who visits in the country, and many of the hazing and initiation stunts common in schools, represent similar more or less unconscious attempts to make up for felt inferiority. A good deal of romantic lying is compensatory in this sense, as for example, when a child of poverty-stricken parents entertains his schoolmates with extravagant accounts of the magnificent doings of rich relatives in another state. In definitely abnormal behavior this sort of compensation is well represented not only in the delusions of grandeur of the insane, but in the morbid or suicidal fantasies of the child or adult who feels himself neglected and unloved.

It would certainly seem that a distinction should be made between such normal adaptive activities as those cited in illustration of Robinson's theory, and the examples of extreme and unsuitable compensatory adjustment which we have just presented. It is important to make such a distinction on practical grounds, for its recognition would lead us to be alert for signs of such maladjustment in children. Just as in the adult excessive interest in sex jokes and the constant retailing of sex stories often indicate a present or at least a past lack of adequate sex satisfaction, and bragging about the glories of one's ancestry may testify to a sense of personal inadequacy; so in children may excessively rough play lead one to suspect a feeling of inferiority, overtalkativeness point to a fundamental lack of self-confidence, and excessive daydreaming along any line indicate some unsatisfied related need. If we are to understand individual children, we must be alert to any such possibilities.

Probably, however, this objection to Robinson's terminology may best be met, not by restricting the term compensation to these extreme adjustments, but by applying to the latter a separate but related term, namely, over-compensation. This expression is already in use, and seems accurately descriptive of the behavior in question. Moreover, if we refuse to call the activities which Robinson has in mind compensatory, what would we call them? They are different from ordinary adjustments in that they minister specifically to a particular thwarted motive; and they answer to a common use of the word compensation, since they serve in a normal and usually desirable way to make up to the individual for something which he lacks. In the writer's opinion, therefore, it will be well to keep the term compensatory to be applied to those normal forms of play which "express the elements of a conflict," in Robinson's termi-

nology. The term over-compensation, then, we may apply to the exaggerated play adjustments in which the same mechanism is present but the process carried so far that the activity is unsuitable to the actual situation.

Thus the objection that Robinson's definition of the term compensatory is too broad, is not, as the writer sees it, justified, since it can easily be met by simply distinguishing over-compensatory play from normal compensatory activity. But granting this, it would still seem that the theory as stated by Robinson is not so widely applicable as he implies when he says in his second article that "play is certainly compensatory." There are two important classes of play, according to the present writer's analysis, to which the theory of play as compensatory conflict-resolution is not applicable.

First there is the direct spontaneous play, such as the romping of a two-year-old after dinner, which is not the outcome of a conflict at all. Much play activity, especially that of the first two years, is merely the most natural and simple response to a present stimulus. To be sure the very existence of a motive, which is a *continuing* stimulus, implies a delay in adjustment, due to the presence of some sort of obstacle or of some degree of inhibition. But there seems to be no justification for applying the term conflict to such mildly problematic situations. In the last chapter we urged that a conflict should rather be thought of as involving the continued or recurrent occurrence of strongly antagonistic impulses.

A second type of play activity which, it seems, will not fit into Robinson's scheme, is what we have called in the chapter on "Why Children Learn," substitute satisfaction of thwarted motives. This type, although the result of conflict, is not compensatory, for instead of satisfying the thwarted motive by some degree of direct expression, it ends

the dominance of the thwarted motive by arousing new and different motives. This unrelated play activity, although it does not express the elements of the conflict, is yet helpful in obtaining adjustment to the total situation.

The Freedom Theory. — The two important classes of play, direct and substitute, to which the compensatory theory does not apply, are comprehended by a sixth theory according to which play is conveniently marked off from other activities by its freedom from conflict and its highly motivated character. These criteria, suggested respectively by W. S. Taylor and by the author, not only serve to define play, but also suggest how it is that children come to play, why their play tends to take certain forms, and what is the special function of play among other types of adaptive activity.

We have seen that transient responses to ordinary stimuli are not properly to be called play activities, for these are elicited by motives or continuing stimuli. As so elicited, they exhibit a constant direction or character, the various parts of the total activity being relevant to the dominant motive. A child whose father was away on a trip at sea, for instance, spent a good deal of time, off and on, in sailing boats of leaves, of paper, or of wood; and was more eagerly interested in stories of the ocean than he had ever been before. It is of good things to eat that Hänsel and Gretel, left at home hungry, tend to daydream. The existence of this more or less loose unity in play activities, together with their conflictless character, is evidence that the underlying motive is being satisfied. The cessation of a particular play activity, in the absence of external circumstances, will be related to the removal or weakening of the persistent dominant stimulus. Thus play activities, although smooth-running and free, will tend to take more or

less definite forms and to run, as it were, a certain course. Depending on the specificity and strength of the motivating situation, they will exhibit a greater or less degree of a type of organization which the *Gestalt* psychologists have called "closure."²⁰ Thus this "freedom theory," as Taylor proposes to call it, accounts for unity and form in play as related to motives, native or acquired, rather than as due to specific instincts, as the older theories imply or state.

Since a motive is characteristically complex, since it refers, not to a continuing simple stimulus but to a situation, therefore we may expect to find that in many play activities a number of part motives are being satisfied. This statement will apply particularly to such complex activities as taking part in a dramatic production or reading a novel. No one special motive, for example, will wholly account for the enjoyment of a detective story by a particular person. Such "play" may indirectly satisfy a variety of motives, such as the desire for travel, or sex motivation, through substitute play or "escape"; and at the same time may directly satisfy other motives, such as the appreciation of rhythm and form and the interest in solving an intricate intellectual puzzle.

The freedom theory or "motive-satisfying theory," as it might sometimes be thought of, applies to all forms of compensatory play, unpleasant as well as pleasant. As we have already pointed out, the occurrence of unpleasant elements in an ongoing activity does not cause conflict if they harmonize with the rest of the activity, that is, if they tend to satisfy the same underlying motivating situation. An activity may be wholly unpleasant and yet have all the spontaneous satisfyingness of play, if it constitutes indirect satis-

²⁰ Where Koffka says that states of "closure" satisfy certain conditions of energy, we would say that a motivating stimulus is, objectively speaking, satisfied. See *The Growth of the Mind*, pp. 100-112 (Harcourt, Brace, 1928).

faction of any strong motive. Recognition of this fact is implied in the common remark that such and such a person is not happy unless she is suffering, and perhaps also in the physician's reference to a beautiful case of manic-depressive insanity, or De Quincey's description of murder as a fine art. The freedom theory thus takes care of all compensatory play, recognizing compensation as one means by which objective satisfaction in free activity is obtained.

But this theory is more widely and usefully applicable than the compensatory theory, in that it recognizes also other types of "satisfying" activity, namely, spontaneous or "direct" play, and substitute play. We shall now see how the theory applies to these types of play activity.

A great deal of play, perhaps most play, belongs in the class of spontaneous activity which is not the issue of conflicts. There is the sheer "animal play" of young children, the running, romping, frolicking, and shouting which seem to be necessary at times before the child will settle down for sleep or rest. This sort of activity satisfies a definite physiological need or needs, and when its occurrence is prevented, restlessness, broken sleep, or sulkiness are common. If such play is thus "satisfying" for young children, one may ask why not for adolescents and adults? Although adolescents and adults are not subject to the same intense intra-organic stimulation as a healthy growing child, common observation indicates that they do at times have similar needs, and if they were healthier, they might be more often similarly motivated. Perhaps if older children and adults would seek more occasion for rough, spontaneous physical play, there would be less temptation to obtain excitement and relaxation through the use of alcohol, emotional outbursts, or other undesirable forms of excitement.

A wide variety of human motives is to some extent satis-

fied through spontaneous indulgence in more highly organized overt plays and games, from hide and seek and croquet to baseball and polo. Many of these ways of obtaining diversion have been worked out in the experience of past generations so as to afford a maximum of enjoyment and are handed down from one generation to the next. It is thus because of social rather than biological heredity that the children of any generation have on tap, as it were, many effective ways of satisfying various needs, and there need be no conflict to occasion their utilization.

"Direct" play will also include a great deal of artistic activity, both productive and appreciative. The simpler and more sensuous forms of æsthetic enjoyment, when spontaneously indulged in, such as singing, drawing, and piano playing, are immediately and directly satisfying to the individual's particular capacities, talents, and likings, in which both native and acquired factors are present. It will be noted that such activities, as well as the related ones of enjoying natural and urban beauty, could hardly be thought of as primarily compensatory, although compensatory factors might often be involved.

More complex forms of æsthetic activity may represent satisfactions, yet not involve real conflict. Writing and enjoying poems and novels, producing, taking part in, or witnessing plays, may of course, under certain conditions, be work, especially for the performer, rarely for the spectator. Again, any of them may be partly or even wholly compensatory. But all these forms of activity may, like traditional organized games, be indulged in simply as enjoyable activities which are readily available means for the immediate satisfaction of motives.

Finally, in this class of play which is not conflict-stimulated we must include any work whatever which is habitu-

ally performed joyfully and with a sense of power in overcoming the obstacles which are involved — which, in other words, is not only spontaneously started, but is satisfying, as marked by the absence of conflicts. The thousand and one useful ways of doing things which the older child so eagerly learns are easily understood as play. There is not only no adult opposition or moral disapproval of such learning, but positive encouragement. Thus any activity for which the child has capacity and inclination is likely to be play activity for him. For some children, school work is play, for others gardening, for still others solving puzzles or playing the piano or writing stories or making model airplanes or repairing alarm-clocks.

A second type of play activity which, it seems, will not fit into Robinson's scheme, but which is comprehended by the freedom theory, is what we have called in the chapter on "Why Children Learn," substitute satisfaction of thwarted motives. This is the result of conflict, but it is not compensatory, for instead of satisfying the thwarted motive by some degree of direct expression, it ends its dominance instead by arousing new motives. Entirely unrelated play activity, not expressing the elements of the conflict, is thus helpful in obtaining adjustment to the total situation. Such substitute activity, though probably never permanently effective, does for the time being keep the individual "satisfied" and free from conflict.

Among the general physiological motives, which, if direct satisfaction is not possible, may be indirectly satisfied for a while through substitute play, may be mentioned pain, hunger, and sex. Pain and other organic stimuli connected with illness are directly satisfied, of course, only through the clearing up of the organic condition. Invalids, however, often make fairly good adjustments by cultivating an inter-

est in reading, writing, or other types of recreation. Robert Louis Stevenson affords a classic adult example. Had his stories dealt largely with white-linen nurses and kindly doctors they would have represented compensatory play. But *Travels with a Donkey* and *Treasure Island*, although they doubtless afforded compensation to the author for some of his needs, are with respect to the organic pain motive distinctly a substitute type of response. Children who are ill or crippled are encouraged to take an interest in other things than their troubles; and games and happy work go a long way toward relieving the stress of the situation. In such cases the pain stimuli are not mysteriously expressed and got rid of in play—it is simply that for the time being other motives come to dominate.

Hunger affords a good example of a motive which it is impossible except momentarily to satisfy through substitute play. Hungry children may indulge in boisterous play which for a time “takes their minds off their troubles.” So insistent is the hunger stimulus, however, that the substitution provides only brief satisfaction; and even while the play is going on, compensatory fantasies of good things to eat are more than likely to occur.

Sex is a physiological motive for which substitute satisfaction in play may be much more effective than in the case of pain and hunger, because sex stimulation is neither so continuous nor so strong biologically as these. The lovelorn high school boy who plunges into athletics, the girl who becomes unnaturally absorbed in her studies, the moody adolescent who becomes an ardent radio fan—all these may find some inner satisfaction and also appear outwardly adjusted for long periods of time, although through the activities mentioned there may be no direct sex expression whatever. Such indirect expression as indulgence in novel reading and other

compensatory waking behavior may be absent during much of the time, although it tends to recur. It seems probable, however, that related compensatory activity of some sort is essential to effective personal adjustment. The point here made is merely that substitute play is also a factor, though perhaps a minor one, in resolving the conflicts between sex impulses and the desire to be moral, conflicts which are prevalent and important in adolescence if not at other times.

So many eager interests do children have and acquire, so many things do they want to do, that, as Robinson says, their impulses are constantly being thwarted. It is probably true that for most of these unexpressed wants no directly compensatory activity occurs. Adults commonly take advantage of this multiplicity of childish interests, by deliberately substituting one interesting activity for another. A baby has seen the children next door playing in their garden swing, and struggles to get out to join them. The tactful parent tries one thing after another to prevent the inconvenient action. Mere verbal appeal is useless, and physical restraint will produce an emotional outburst; but the production of a pretty picture book with a promise to read a story, or the putting on of a favorite victrola record, may produce magical results. In the case of an older child whose heart has been set on attending a picnic which it now appears will not take place, an afternoon of sulking may be prevented by permitting a visit to the movies with a companion. Probably, however, it is only as a means of adjusting to the more temporary and less deeply fixated motives of children that substitute play is really successful.

As a mode of resolving conflicts, substitute play really corresponds to what in contemporary critical thought is called "escape." When the physician advises his nervous patient to take a vacation in the pine woods, or when anxious par-

ents ship their lovelorn offspring off to Europe in the hope of curing the trouble, quite literal escape is sought. But the troubled individual who is unable to travel may find satisfaction through a book, in a mental flight to the South Sea Islands. The discontented housewife may neglect her work to find solace in romantic novels of the Middle Ages. James Branch Cabell helps intellectuals, tired from pondering problems of their world, to find peace in mythical Poictesme. It has been suggested that much of adult religion and pseudo-philosophy represents, fundamentally, an escape. The problems of the workaday world being too difficult to face, they are avoided by taking refuge in another world, a world of thought which affords pleasant solutions of perplexing problems. The mechanism of escape may underlie the absorption of children in impossibly romantic tales of other times and other lands, and especially in fairy tales.

A discussion of the psychological effects of Christian Science, New Thought, or even Platonic Idealism would be out of place in this book. But the opposition of modern critics to the "philosophy of escape," may lead us to question to what extent substitute play, whether overt or implicit, is effective and desirable in the mental adjustments of the child. The question is an important one, both theoretically and practically. The Freudians and some orthodox psychologists would have us believe that even such a strong physiological motive as sex may be adequately expressed by "diverting the sex energy into other channels"; and guardians of the young often act on the assumption that athletics, travel, hard work, or religion, or a combination of these, will adequately resolve a serious childhood conflict. But we have seen reason in the preceding chapter to question the soundness of the general doctrine of sublimation which is implied in these attitudes; and we may now point

out some of the limitations of substitute play as satisfying activity.

The main point to be made is that, since substitute play satisfies a motive only in the objective sense of ending its dominance by *avoiding* it, the original motivating stimulus at the basis of the conflict remains unadjusted to or "unexpressed." If, with the Freudians, we conceived of the original motive as a general reservoir of energy which could flow out through various channels; or if with certain *Gestalt* psychologists we thought of the condition in general terms as a psychic tension to be relieved, then it might seem reasonable that the substitute activity would minister directly to the original need. But it is clear that substitute responses could not change a motivating stimulus to which they are not directly related. For this reason, it would seem that substitution can never, in a conflictful situation, be anything but a merely temporary or partial or compromise means of adjustment, unless perhaps the original need is transient.

The limitations of substitute play are perhaps most clearly illustrated in the case of sex conflicts. Not merely clinical experience with neurotic subjects, but also the observation of the behavior of perfectly normal children and adults, indicates that the attempt to satisfy an awakened sex urge by entirely non-sexual substitute activities, is likely to bring results nothing short of disastrous to the child. In cases in which there is no overt sex behavior, and "no interest in sex"—no association with members of the opposite sex in play, no novel reading or talk or questions about sex;—investigation seems to show a good deal of hidden sex behavior.²¹ Sexual dreaming and daydreaming may be extensive though

²¹ For an illustrative case study see MARTIN W. PECK's article "Psychoanalytic Theory of the Neuroses," *Jour. of Abn. and Soc. Psychol.*, 23: 182-203 (1928).

concealed by the child, and masturbation of some sort is exceedingly common. In many cases there is overcompensatory behavior shown in prudishness or ardent "idealism," behavior which is possibly an extreme form of "substitute satisfaction."

All of this indicates that a child who is maturing or mature sexually, and who seems to be trying to "sublimate," is in need of help. As shown in the chapter on the problem of motivation, it is not clear that "direct biological expression" of any sort is essential to normal adjustment. But indirectly "satisfying" activities are essential. Of great value in adjustment are compensatory play activities, such as the reading of novels and plays which deal in a frank and wholesome way with sex themes. "Idealistic" works of art which ignore sex entirely, or which deal with it in a figurative, romantic, or distorted way, are to be condemned on psychological grounds not only as failing to satisfy sex curiosity and as thus helping to keep it alive, but also as tending to prevent adjustment through suggesting false beliefs. The same general point may be made about a common type of pamphlets and books designed for the instruction of youth in sex matters. Social games involving association with members of the opposite sex, and general association of boys and girls in common enterprises, are important means of controlling sex behavior. Besides forms of play, adequate adjustment is also furthered by, in fact is probably impossible without, objective thinking and reasoning about the whole subject. If all these means of adjustment could be honestly tried, much of the storm and stress of adolescence might be avoided.²² As one still-troubled adolescent put it, instead of being a time of struggle and

²² HOLLINGWORTH, LETA S., *Psychology of Adolescence* (Appleton, 1928) is a stimulating and constructive treatment of the major problems of adolescence.

disillusionment, adolescence might be a period filled with the rush of new life and the broadening of new horizons.

We may take one more case to illustrate the limitations of substitute play. In the case of grief over the loss of a beloved person, there is a tendency to respond directly by weeping or by continual dwelling on thoughts of the departed. An overcompensatory adjustment may take the form of an extreme idealization of the beloved person, of excessive daydreams about his present happiness in another world, or of fantasies of his return. The maladaptive character of these adjustments needs no emphasis. There is considerable question even as to the wisdom of the advice to cry it out. In the case of grief substitute play might seem to be demanded, and if it ever constitutes an adequate type of adaptation we might expect it to do so here. Certainly the value of persistent cultivation of new interests, and a change of scene and of occupation, is apparent. Instead of reading which reminds him of his loss, the subject may be encouraged to indulge in optimistic and bracing literature, and to avoid tragic drama. Such "play," in addition to the work which is of course indispensable, might be thought sufficient.

But however useful these aids may be in temporary adjustment, if the loss is serious, grief cannot be permanently assuaged by such means. Again the real problem has been avoided, the basic motivating stimulus unadjusted to. If the individual is to be "satisfied," that is, adapted with respect to the situation, the whole problem must be faced and some adequate direct adjustment thought out. While calm and objective reasoning is probably a *sine qua non* of really adequate adjustment, certain forms of play activity may be a most valuable aid. Tragic drama may do more than allow some physical "outlet"; and through literary and other

treatments of situations similar to his own the subject may gain new and most helpful insights.

The fact that substitute play is not an adequate way of dealing with grief holds even more true of the child than of the adult. A child so quickly turns to other things, so soon seems satisfied and happy, that adults are often entirely ignorant of the secret suffering he may be experiencing. Sometimes there are conflicts which reveal themselves in dreams and special interests, the significance of which adults do not see; and in some cases unconscious stress may continue which will cause trouble for years, or influence the whole development of the personality. The need for some sort of direct adjustment at the time or very soon thereafter is urgent.

Substitute play and "direct play" as well, the foregoing discussion has shown, are explicable in terms of the freedom theory. This theory, which applies to compensatory activity also, seems in fact to be the only one which comprehends all forms of play. It has an advantage over the preparation, recapitulation, and relaxation theories, in that it does not conflict with modern findings about neural activity and instinct. Yet it is able to account for the characteristic forms which play takes, and implies the functions which are suggested by these stimulating older theories.

It is no objection to the freedom theory that other than play activities are "motive-satisfying." For according to this view, as we have here developed it, play not only satisfies motives, but satisfies them in a particular manner. As relatively free from conflict, play is usually characterized by a pleasant sense of effortlessness. A more pertinent objection might be that the proposed theory is too broad, as applying to much activity which is ordinarily called work. The name, too, is subject to criticism, on the ground that it per-

haps does not suggest the essentials of the theory. These objections, however, do not seem insurmountable. We can hardly hope to formulate a theory which will draw a clear-cut line between work and play — and probably we should not try to, since there is no such line in nature. And a name, after all, is just an arbitrary abbreviation. On the whole, the freedom theory seems to have definite advantages.

VALUES OF PLAY

WE MAY roughly classify the values of play as educational, hygienic, and integrative. Since our interest in this book is not primarily in the applications of child psychology or its relation to the general care of the child, we shall not dwell upon the first two.

Educational. — If we consider education in a broad sense as involving the transmission of the social heritage, we can see that play is, or may be, of the greatest educational value. Through play, undirected or directed, the child becomes familiar with the manners and customs of his social group, as well as with the prevailing ideas and ideals. Through play he learns the fundamental habits which will be basic in adult life, and may obtain valuable practice in some of the activities of his future life work. Play thus serves as a most valuable preparation for life; but, we may add, a preparation valuable not because of any instinctive character which it has, but largely to the extent to which it accomplishes a modification of primitive tendencies in the direction of social usefulness.

If the above values were due solely to the content of the play activities, they could not be said to be distinctive values of play, for the same things may be learned as home or school tasks, or in the course of carrying on one's life work. But if because of the peculiar characteristics of play

the child may more effectively or more adequately acquire the racial heritage than through work, then we may say that play has an educational value not possessed by work. This is, surely, the case. In the first place work, as conflictful, is likely to be avoided by the child—and he is tempted to neglect it for other activities whenever he can. But if the things to be taught can be presented in such a way as to constitute play, there is no longer the motive for avoidance, and more will be learned. Again, activities which are pursued in the free spirit of play are likely to be more adequately learned, than when engaged in as work. The individual engaged in activity which is not so definitely prescribed by rules and limitations is more open to new impressions, and likely to achieve insights and appreciations which he might otherwise miss.

If the free spirit of play is so conducive to ready and effective learning, one might suppose that it would be desirable to turn all educational tasks into play activities; and there is at present a tendency in that direction. But because play is good, it does not follow that the more play the better. Moreover, some natural play, as we have suggested in earlier parts of this chapter, is positively antisocial in character; and there must be considerable direction and restraint, of a sort, in the teaching of children, if they are to become adults who will live effectively with their fellows. Besides, the conditions of life are such that every child, sooner or later, will be called upon to perform difficult tasks—and probably to engage for long periods of time in activities which are not intrinsically satisfying. For this reason a child who has not learned the value of hard and systematic work will not be well prepared for adult life.

Hygienic.—Recognizing the unity of the human organism, the psychologist sees the indirect but genuine psycho-

logical importance of any means of keeping the human body in good physical condition. Play, as furnishing rest to fatigued muscles, and providing exercise essential to health and normal growth, is one such means. Another hygienic value of play is its generally exhilarating effect on the organism. It is not merely that those parts of the organism which get rest or needed exercise, as the case may be, are affected by play. The whole organism is "toned up," invigorated, made ready for new activities. We do not know the precise nature of the vaso-motor and other organic changes which produce this heightening of tone, but its psychological effects can be observed. The individual may lose in play a sense of general fatigue, or he may feel increased fatigue in certain parts of the body, but in any case he will have a pleasant sense of exhilaration and power which is the conscious correlate of increased bodily fitness. He is better prepared for any activity which may follow, "physical" or "mental," play or work. Thus in producing effects that are physically hygienic, play is also a factor in mental hygiene.

Integrative.—We may use the expression "integrative values" to refer to the ways in which play aids in the total adjustment of the individual—or, in other words, in the organization of his personality. In a certain sense the raising of the "hedonic tone," just discussed, is an integrative value, since the individual is in such a condition that "his thoughts flow more easily," and the work of rational organization is facilitated. But this tonic effect, after all, merely consists in preparing the individual for integrative activity. Much activity which has a tonic effect on the organism is only indirectly integrative.

One direct way in which play may fulfill an integrative function is through contributing suggestions or "chance successes" in the solution of a problem. A freely varied attack,

we have seen, is essential to successful reasoning. A mind which ranges freely, which is open to all sorts of ideas, even to ridiculous ones, is more likely to hit upon a good working idea than one which works painfully within a limited field, where new hypotheses come into sharp conflict with old ways of thinking. Thus the individual who indulges in mental play, who has a "fertile imagination," has an advantage in attacking various minor problems of living, as well as in achieving a rational organization of his personality. Brilliant hypotheses and transforming insights, as well as suggestions less important, may come to individuals in the course of games of golf or walks with friends, while reading novels or writing poems or dreaming day-dreams. And the person who keeps the spirit of play even when engaged in reasoning proper, the person who finds real satisfaction in considering, comparing, and testing hypotheses, is on the whole more likely to succeed in his thinking than one who makes work of it.

If we grant that an integrated personality is one characterized by the absence of conflict, then in a certain sense of the word, all play is integrative, since in satisfying motives it removes conflicts. In so doing it tends toward integration, although this may often be only temporarily or incompletely accomplished. While a child is engaged in play his whole activity is, characteristically, concentrated on the situation of the moment—irrelevant thoughts and acts do not disturb him. For the time being, his behavior is almost completely organized. He is a unit. We might think, therefore, of any play activity as being genuinely integrative as long as it is going on.

But often a given play activity, while it satisfies the dominant motive in an individual and absorbs his attention for a time, and is thus temporarily integrative, does not aid in

his total adjustment to the conditions of his life. Let us take the case of a little girl who lives in a disorderly and unclean house, who derives great satisfaction from daydreams of shining cottages with white scrubbed floors and bright geraniums between fresh muslin curtains. As soon as she returns to her humdrum work in the house the same old discontentment will arise. Unless the play is translated into actuality, as through learning to take care of her own play house, the girl is really no better adjusted to her environment than before. Moreover, the mere fact that she may habitually get her satisfaction from play instead of from an actual attack on the sordid environment may prove in the long run a factor making for disintegration. She may grow up into an adult whose personality is so divided that there is an undesirable, even a pathological, contrast between her actual behavior and the dream life in which she gets her chief pleasure. Nevertheless while the play is going on it tends toward temporary integration—that is, toward harmony among the impulses of the playing individual, if not of his total activities.

Often a person, child or adult, is getting satisfaction through play for some of his stronger motives, but not for others. Within certain aspects of his total activity, conflict is lacking, and we may say that to that extent he is integrated. For example, a person who has a great love of music, and thinks he is musically talented, may be very happily adjusted in his home life and his work, but his æsthetic longings may remain unsatisfied. Few people obtain a high degree of satisfaction of all their leading motives.

We may conclude that while some play is in the long run unadaptive or even maladaptive, play in general serves a genuinely integrative function. It usually furnishes only partial and incomplete satisfactions, to be sure, but these

leave the individual better adjusted, with fewer chances of conflict and disorganization. Since many motives in civilized human beings cannot be fully and directly satisfied, indirect means of satisfaction will be utilized, and play is seen to be a most important means.

There still lingers in our society the vague notion that play is somehow ignoble and seldom to be indulged in. But more and more, as people learn how much more genuinely "satisfying" play is than the hard grind of forced learning, reluctant work, or painful reasoning, may we expect those who bring up children to utilize play as perhaps the most truly integrative type of human behavior. This view of play is consonant with Spinoza's ideal of the free man. He is the person who not only enjoys the simple pleasures that come his way, but whose whole activity has the spirit of play, because it is harmoniously integrated in the satisfaction of the dominant ideals of the personality.

CHAPTER XII

GENERAL CAUSES OF JUVENILE DELINQUENCY

A STURDY and attractive nine-year-old boy was being questioned by a kindly doctor about his experiences. He had run away repeatedly from orphan asylums and foster homes; he lied, stole, and set fire to buildings. He answered the questions with a certain sullen impudence, until the doctor pressed him to tell what he thought about his own mother. Suddenly he burst into tears, and rushing across the room, flung himself under a couch, sobbing violently.¹ In England a youngster at the age of seven got hold of a little friend who refused to give up a toy, and held the boy's head under the surface of the water in a canal until he drowned.² A Boston boy who was a "born thief" and had bad sex habits used to feel extremely sorry about his wickedness. From time to time he would read his grandmother's Bible, make confessions, and return stolen articles. Finally at fourteen he left his quarrelsome family to set up housekeeping for himself in a basement room the rent of which he paid from his small wages. Not long afterward he committed suicide in his room by shutting the windows and turning on the gas.³

¹ Case observed by the author during the summer of 1923-24, at the Boston Psychopathic Hospital.

² BURT, CYRIL, *The Young Delinquent*, pp. 1-4 (Appleton, 1925).

³ HEALY, WILLIAM, *Mental Conflicts and Misconduct*, pp. 187-193 (Little, Brown, 1917).

Why do such things happen ? A number of theories have been proposed, and a good many investigations conducted, in an attempt to answer this question. The subject of juvenile delinquency is of such far-reaching social importance, and its study so significant for the light it may throw on problems of non-delinquent conduct, that we shall go into some detail in the analysis of these theories and the methods employed in studying causation. As a preliminary step to this analysis, we should understand clearly what is meant by juvenile delinquency, and why the subject is of especial social and psychological significance.

The word delinquency as applied to juvenile conduct may be said to correspond roughly to the word crime as applied to adult offences. A juvenile delinquent is technically a person legally classified as a child who commits an offence punishable by law. Such offences range from acts like taking a chance in a lottery (illegal in some places) through cases of theft and arson to premeditated murder. There are all degrees of social seriousness in the behavior involved. Many childish acts, while not punishable by law, will of course approach or even exceed in seriousness those which are so punishable. Furthermore, we shall expect to find no sharp line at any point between the simplest misdeeds of an ordinary child and acts which are technically delinquent.

The study of juvenile delinquency has important bearing on the problem of adult criminality, one of the most serious problems with which society has to deal. The adult criminal has been, usually, a juvenile delinquent. It is difficult, of course, to fix the age when a delinquent career begins, but we can obtain figures on the age of first conviction. Murchison in a study of 3942 American criminals calculated the percentage in various age groups, on the basis simply of age recorded on the admission card, regardless of

previous convictions. He found that twenty-one per cent were between fifteen and twenty years of age, and twenty-six per cent between twenty-one and twenty-five. Thus nearly half of his entire convict population was twenty-five years of age or less.⁴ Goring found that of 2204 English recidivists (criminals who have received two or more convictions) eight hundred and fifty-nine had received their first conviction between the ages of fifteen and nineteen inclusive. He found the average age at first conviction to be twenty-two years.⁵ When we consider that the first conviction would perhaps seldom correspond to the first offence; and further that illegal conduct might naturally be assumed to grow out of legal but unethical misdoings of a less serious nature, these figures are seen to be highly significant. The psychological study of juvenile delinquency is thus seen to be very important for the light it will throw on the genesis of adult criminality, as well as on problems of normal conduct in children.

THEORIES OF INNATE CAUSATION

ACCORDING to an important group of theories, delinquency is typically caused by some hereditary peculiarity which predisposes the individual to antisocial conduct. Sometimes two or more such general causes are assumed to be basic. Thus there is a single major cause or a small group of major causes, while the other antecedent circumstances or conditions which may be related to the delinquency are thought of as secondary, minor, or merely immediate causes.

The Theory of the Criminal Type. — According to this famous theory, first formally enunciated by the Italian

⁴ MURCHISON, CARL, *Criminal Intelligence*, chap. viii (Clark University, 1926).

⁵ GORING, CHARLES, *The English Convict*, pp. 201-202 (Darling, 1913).

criminologist Lombroso about 1880, a great deal of crime is caused by innate criminal propensities in individuals who are called born criminals.⁶ These are supposed to possess well-marked psychological characteristics including deficient sensitivity to pain and certain other stimuli, unnatural social emotions, and a defective moral sense; and in addition, peculiar and definite physical traits by means of which a diagnosis of criminality may be made. There are many of these measurable physical stigmata, including excessive development of the jaw, misshapen ears, and prominent cheek bones.

The generalizations made by Lombroso and his followers were based on extensive anthropometric measurements of criminals. It is admitted that normal people often possess some of these stigmata, but the criminal is alleged to possess a diagnostically significant number and combination of them. The true criminal is thus said to be distinguished by inherited pathological characteristics which, according to Lombroso, are essentially atavistic. They are the characteristics of lower races and also common characteristics of the child.

But while the "germs of criminality" are found normally in all children, who are lacking in moral sense, most children, it is explained, outgrow this primitive stage. Some, however, "the born criminals," do not; and especially if the environment is conducive to the development of criminal traits, they appear very early and the child is incorrigible. The method of treatment for this "disease" is segregation with an attempt at cure.

Lombroso in his later years placed more emphasis on the importance of environmental factors in crime, but still main-

⁶ *Criminal Man according to the Classification of Cesare Lombroso, Briefly Summarized by His Daughter Gina Lombroso* (Putnam, 1911).

tained that the significant causal factor is inherited criminality which may be detected by measurements and observations of physical stigmata. He was a pioneer in insisting that the chief business of the criminologist is to study not crime, but the criminal. Regarding the criminal as a sick man he opposed ordinary primitive measures for the prevention of crime, emphasizing rather the need for proper care and education of the children of the poor. Although highly respected by many for his practical influence, his theories as years went on were increasingly attacked.

Goring, an English scholar, tested this theory on a large scale by making careful comparative measurements of an unselected group of over twenty-three hundred convicts in English prisons, and of about one thousand students of Oxford and Cambridge Universities and other non-criminal groups. The extensive results, treated by the most careful statistical methods, showed that there was as high a percentage of the various alleged physical stigmata among college men as among the inmates of prisons. There was no significant difference between the anthropometric measurements of the criminal and the non-criminal groups,⁷ except for a slight superiority in height and weight in the latter. Goring's work (1913) dealt a crushing blow to the theory of a physical criminal type. In Italy only, it seems, is the central theory still important. As we shall see, however, the idea underlying that theory, namely, that there is an important hereditary basis for crime, persisted even when the Lombrosian formulation was given up.

The Theory of Innate Moral Imbecility. — Closely related to the doctrine of Lombroso, this theory originated in England where the study of many criminals seemed to show that while of normal intelligence, they had never

⁷ GORING, *op. cit.*, Pt. I, pp. 45, 139-173.

given evidence of "powers of moral discrimination." They had long careers of delinquency in childhood and youth, leading to adult criminality, and all efforts at reform were futile. Finally in the British Mental Deficiency Act of 1913 there was included a provision making it possible to certify as moral imbeciles, "persons who from an early age display some permanent mental defect, coupled with strong vicious or criminal propensities, on which punishment has had little or no deterrent effect." Tredgold, the noted English authority on mental defect, has considered moral imbecility to be an important cause of crime. Citing cases from his experience as illustrations and emphasizing the point that the individuals in question may be of normal or even superior intelligence while lacking a moral sense, he has insisted that, as incapable of reformation, they should be permanently segregated.⁸

This theory of a deficient moral sense, though losing ground, is still held by some scientific students of human nature, and is widely prevalent in popular thought. But evidence against the theory, gained mostly in psychological clinics, has steadily accumulated. Dr. William Healy, who is probably the leading living authority on juvenile delinquency, said in 1914: "When we began our work there was no point on which we expected more positive data than on moral imbecility. But our findings have turned out to be negative. We have been constantly on the lookout for a moral imbecile, that is, a person not subnormal and otherwise intact in mental powers, who shows himself devoid of moral feeling. We have not found one. Many cases have been brought to us as moral imbeciles, but they have always turned out somehow mentally defective or aberrational; or to be the victims of environmental conditions or mental

⁸ TREDGOLD, A. F., *Mental Deficiency*, pp. 348-349, 498 (Wm. Wood, 1908).

conflict, and not at all devoid of moral feeling. Superficially the individual frequently has seemed to be mentally normal, as in the cases where there was great development of language ability, but in every single instance a well-rounded investigation has shown distinct abnormality in some other field than the moral sense, or, in a few cases of children, further growth has carried the individual past a stage of antisocial conduct.”⁹

The findings of Healy are representative of those of other recent scientific investigators of delinquency, and the theory of the moral imbecile is not now generally accepted by psychologists, at least in America. It looks as if the earlier doctrine had been based on incomplete studies of individuals, since with exhaustive genetic study of the factors in individual cases, the supposition of innate moral, as distinct from mental deficiency, has had to be abandoned.

Besides factual evidence against this doctrine there are well-grounded theoretical objections. The theory would involve the assumption of innate ideas, since moral decisions are judgments of right and wrong. If some people lack a moral sense, the implication is that most people have it; that is, that most people have the inherited ability instinctively to tell right from wrong. Such an assumption has been seriously questioned by students of the human mind since John Locke, and is contrary to the findings of modern psychology. The theory that there is an innate moral sense really belongs in the pre-scientific period when it was the fashion to explain complex classes of phenomena by assuming a single instinct underlying each one.

The Theory of Innate Mental Defectiveness.—In order to understand the psychological basis of this, the most

⁹ HEALY, WILLIAM, *The Individual Delinquent*, pp. 783-784 (Little, Brown, 1920).

important of the general theories of causation, it will be necessary briefly to summarize the main results of the psychological testing of delinquents.¹⁰

In the United States the first testers made use of the pioneer French scale of Binet, translated into English in 1910, and of a revision of that scale brought out in 1911 by Goddard, a prominent American psychologist. These tests were given widely to delinquent and criminal groups, with astonishing results. The authors of the investigations, most of them psychologists, reported that from thirty to ninety per cent of individuals in these groups were mentally defective. These figures included the upper grades of the "feeble-minded" who at Goddard's suggestion came to be called "morons," and who, as potential criminals, were considered to be particularly dangerous to society.

In 1916 Professor L. M. Terman wrote, "There is no investigator who denies the fearful rôle played by mental deficiency in . . . delinquency."¹¹ As late as 1919, Goddard wrote, "Every investigation of the mentality of criminals, misdemeanants, delinquents, and other antisocial groups has proven beyond the possibility of contradiction that nearly all persons in these classes, and in some cases all, are of low mentality. Moreover, a large percentage . . . are feeble-minded. . . . The greatest single cause of delinquency and crime is low grade mentality."¹² Thus was born the doctrine of the delinquent moron. Invented and spread by psychologists, it was taken up enthusiastically by judges and social workers, popularized by magazines and newspapers,

¹⁰ The following sketch of developments in the intelligence testing of delinquents is abridged from an account by the author, "The Intelligence of Delinquents in the Light of Recent Research," *Sci. Mon.*, 22: 132-138 (1926).

¹¹ TERMAN, LEWIS M., *The Measurement of Intelligence*, p. 9 (Houghton Mifflin, 1916).

¹² GODDARD, H. H., *Human Efficiency and Levels of Intelligence*, pp. 72, 73 (Princeton Univ. Press, 1920).

and accepted by educated people in general. The doctrine seemed to rest on a firm basis of factual evidence.

This evidence, however, was entirely untrustworthy. In the first place, we know now that tests, and particularly language tests of this type, are by no means accurate measures of native intelligence. In the second place, these particular pioneer tests were very inadequately standardized, especially for the ages above twelve, for which only a few normal subjects had been tested. It has since been found that the standards for these upper ages were very high, so that even a person of average intelligence would be made out defective or even feeble-minded according to the tests. One reason why this fact was not found out earlier is that the tests were applied wholesale to delinquents before a significant number of normal people had been tested. This is the chief reason why the results of the tests of delinquents and criminals are unreliable. A third reason why the results should not have been accepted uncritically is the fact that much of the testing was done carelessly, by inexperienced examiners.

While this pioneer work is largely responsible for the prevailing attitude, later work tended to confirm it. By the use of the careful Terman revision of the tests, published in 1916, there was still found a considerable percentage of defectiveness among delinquents, although the estimates in general now ranged from fifteen to thirty, instead of from thirty to ninety. These "conservative" figures were accepted as accurate. But still there had been no adequate comparison with the general population.

A comparison with non-delinquents in general was made possible when the results of the army testing were published in 1921. When the Terman (Stanford) revision was given to about seven hundred unselected adults in the army, their

average mental age was found to be only thirteen.¹³ Yet Terman, after testing sixty-five Californians, had fixed sixteen as the average adult standard. If we used the Terman standard as a basis for determining the amount of feeble-mindedness in the army, we should have to conclude that about twenty per cent of the army (and hence by inference of the general population of the country) are definitely feeble-minded, and another twenty-five per cent borderline deficient. Now, assuming that the army represents fairly well the general population, we see that by the use of these standards, there would be on the whole just as large a percentage of mental defectiveness in the general population as in delinquent groups. Obviously, even the Terman standards were wrong, since it is clear that by no means twenty per cent of our population is in any significant sense feeble-minded. Yet these or similar standards have until recently continued largely in use as a basis for the interpretation of delinquent intelligence.

Healy, in *The Individual Delinquent* (written in 1914), had found, using the old standards, only eleven per cent of mental defectiveness.¹⁴ The figures in the new book by Healy and Bronner, *Delinquents and Criminals* (1928) are still based, for the sake of making possible comparison with and utilization of earlier data, on the old adult mental level of sixteen years. Putting all their carefully gathered results together, the authors find among the 4000 repeated juvenile offenders studied by them since 1917, 13.5 per cent clearly feeble-minded. But this, they say, does not tell the whole tale, for if we consider the army findings, the *I.Q.* for ages higher than fourteen would be increased. The distribution curves for the intelligence quotients of 701 Boston girls and

¹³ *Memoirs National Academy of Sciences*, Vol. XV, pp. 564, 621, 635 (1921).

¹⁴ HEALY, *The Individual Delinquent*, pp. 131-132.

1625 Boston boys, given in Fig. 21, shows normal distribution with median *I.Q.* of ninety. "Undoubtedly," the authors state, "what on our chart is now reckoned as *I.Q.* ninety is near the median for the general population, instead of *I.Q.* one hundred. So the apex of the curve is very close to that for American citizens in general."¹⁵

Burt's figures on mental defectiveness are particularly worth considering since in his extensive investigation of factors in delinquency he used a control group. He compared two hundred juvenile delinquents with four hundred non-delinquents of the same age and social class. Unfortunately he apparently did not use objective criteria of social status, beyond taking children who lived usually in the same street and attended the same school as the delinquents. Using Binet-Simon tests and considering fifteen to be the average adult mental age, Burt classified seven and six-tenths per cent of his delinquents and only one and two-tenths per cent of his non-delinquents, as mentally defective (below seventy *I.Q.*)¹⁶ There was a wide distribution of intelligence in the delinquent group. These findings, while indicating that mental defectiveness may play a rôle in the delinquency of the group studied, are directly against the theory that mental deficiency is a major cause.

Published reports of the testing of delinquents since the army report have in general tended to confirm the hypothesis that there is not a great deal of difference between delinquent and normal intelligence. Extensive studies by Murchison of large numbers of adult criminals reveal no significant differences in test scores between these and non-delinquent groups.¹⁷ Fernald, Hayes, and Dawley found the

¹⁵ HEALY, WM., and BRONNER, A. E., *Delinquents and Criminals, Their Making and Unmaking*, p. 155 (Macmillan, 1926).

¹⁶ BURT, CYRIL, *op. cit.*, chap. vii, pp. 286-288.

¹⁷ MURCHISON, CARL, *op. cit.*

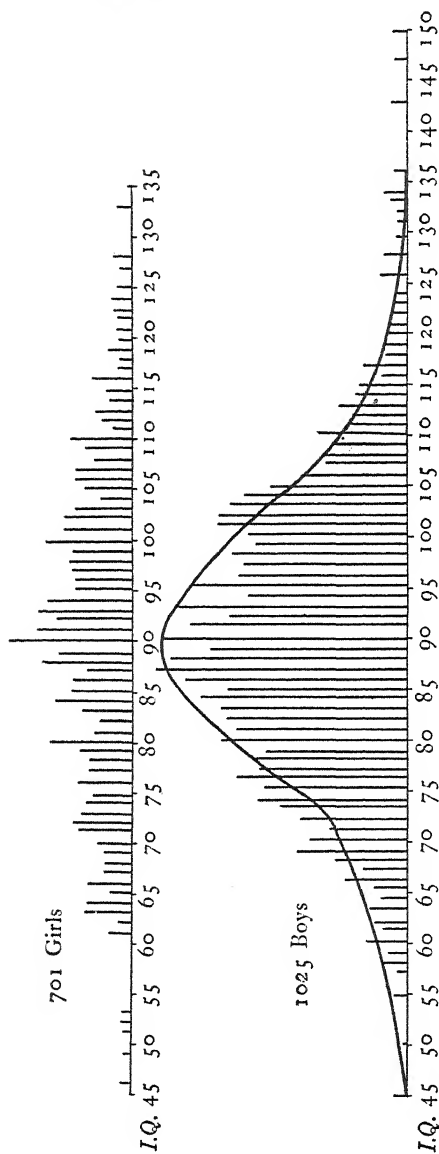


Fig. 21. DISTRIBUTION OF INTELLIGENCE QUOTIENTS OF JUVENILE REPEATED OFFENDERS

From Healy, *Mental Conflicts and Misconduct*, p. 154. (Copyright, by Little, Brown & Co., 1917. Used by permission.)

average mental age of four hundred and forty-seven delinquent women confined in institutions in New York State to be 11.8, which is about four years less than the average mental age assumed by Terman. But it is only a little over a year less than the average mental age of the army group. There are reasons for supposing that the average intelligence of these sentenced women is somewhat less than that of women delinquents in general. The authors state that with regard to intelligence, the indications are that the group of women is somewhat inferior to the general population, but they call attention to the fact that the difference is slight and the overlapping large.¹⁸

More recent work on the intelligence of delinquents has put the whole subject in a much clearer light. The outstanding work has been done by Dr. John Slawson, who investigated the intelligence of over fourteen hundred boys in four institutions for delinquents in New York State.¹⁹

In the National Intelligence Tests, group tests which, like the Stanford scale, may be considered measures of abstract verbal intelligence, the whole group of 1445 delinquent boys proved markedly inferior to the non-delinquent unselected children on whom the tests were standardized. Had they been of equal "tested intelligence" (intelligence as measured by tests), fifty per cent would have reached or exceeded the norms (average or median performances) of these non-delinquents. As a matter of fact, only 17.7 per cent did so. In the Thorndike Non-Verbal Test, which was designed to indicate ability to manipulate objects, the delinquent boys as a group were still inferior to the non-delinquents, but

¹⁸ FERNALD, M. R., HAYES, M. H. S., and DAWLEY, ALMENA, *A Study of Women Delinquents in New York State*, p. 527 (Century, 1920).

¹⁹ SLAWSON, JOHN, *The Delinquent Boy, A Socio-Psychological Study*, chaps. i and ii (Badger, 1926).

much less so than in abstract verbal intelligence. In the non-verbal test 32.6 per cent reached or exceeded the Thorndike norms.

These findings might be interpreted to mean that the greater inferiority of the delinquents in abstract as compared with concrete intelligence, stands in direct causal relation to delinquency; that is, that inferiority is present because we are dealing with a delinquent group. But Slawson reminds us that it may be partly or wholly due to other factors, such as race or social status. Many investigations have shown that certain nationalities test lower than others, and that those of lower social status test lower than those of higher social status. The best way to find out whether the inferiority in tested intelligence is associated with delinquency rather than with social status or nationality, would be, Slawson says, to compare directly the performance of delinquent and of non-delinquent groups which have the same social status or nationality. Since this is at present a practical impossibility, the next best proceeding is to try to determine, for a given delinquent group, whether the proportion of those of foreign born parentage, and also the proportion of those of inferior social status, is or is not very much larger than in the population of the country as a whole.

Comparing foreign born, colored, and native white Americans in his group with percentages for the population as a whole as represented in the 1920 census of New York State, Slawson found that among the delinquents there were one and a half times as many foreign born boys, and three and a half times as many colored boys, as in the unselected boy population. When he analyzed the performance of the delinquents by nationalities in three institutions where several nationalities were represented, he found his hypothesis

of the possible importance of the factor of parentage confirmed. The results at the New York House of Refuge, the largest institution, are typical. There the Italian, Polish, and colored boys were decidedly inferior to the American boys in abstract intelligence as measured by the tests, as we might expect since non-delinquent groups of these "races" have been found in many investigations to test lower than Americans. The few Hebrew boys tested somewhat better than the Americans, but there were too few of them to raise the average materially. These foreign groups constituted a sufficiently large proportion of the delinquents in the institution as a whole to warrant the hypothesis that the inferiority of the delinquents in intelligence was a matter of race rather than of delinquency.

In concrete intelligence as measured by the Thorndike tests, the American boys and the colored boys did better than in the National Test, but their gain was much less than the gain made by the Italian, Polish, and Hebrew boys. The 26.5 per cent of Italian boys did as well in concrete tests as the American boys. Since in Italian, Polish, and Hebrew homes the foreign tongue is spoken, Slawson believes these results show the importance of a language handicap in lowering the average score of the delinquents in the National Tests, and still further call in question the causal relation of intelligence to delinquency.

At the present time there are no accurate objective figures on social status in the unselected population. But a rough comparison of delinquent with non-delinquent groups may be made by taking occupation of parents as an index of social status. In the 1920 New York State census, 7.5 per cent of the individuals having occupations are classified as laborers, while the percentages of living fathers of delinquent boys thus classified range from 26 per cent to 29 per

cent in the various institutions. While the occupations of 7.5 per cent of unselected individuals are classified as professional, the corresponding percentages for the fathers of delinquents range from 0.6 per cent to 3.3 per cent. Such figures as these, as well as qualitative studies of delinquent groups, indicate that inferiority of social status among delinquents is much more marked than it is in the unselected population.

Now, since a good many careful studies have shown that among non-delinquents inferiority in social status is associated with inferiority in tested intelligence, the above findings suggest that inferiority in the tests is more closely related to social status than to delinquency. This inference is strengthened by comparison of delinquent groups with non-delinquent groups of *similar social status*. (1) When the Stanford-Binet scores of the native white boys over sixteen years of age at the New York House of Refuge are compared with the scores of the native white army recruits, who presumably represent a more similar social status than the group on which the Terman tests were standardized, the difference is found to be slight, though in favor of the drafted men. (2) When Slawson compared the scores of delinquents at two institutions with those of dependent but non-delinquent boys living in a county home, he found the performance of the delinquents to be even better than that of the non-delinquents. (3) Finally, Slawson cites the study of Stenquist, Trabue, and Thorndike, who found that of two hundred and sixty-five public charges in a certain county, there was no difference in test scores between delinquents and non-delinquents, although all were inferior to ordinary children of corresponding ages. All did better on the tests of mechanical ability than on the verbal tests.

These findings indicate that social status is a very im-

portant factor in the relation between delinquency and inferiority in intelligence, a relation which therefore may not be direct at all. When social status is made constant, the difference between delinquent and non-delinquent groups almost vanishes.

Now it is possible, as many psychologists have argued, that low social status is the direct result of low intelligence; that is, that people get into inferior environments because of lack of innate ability to rise higher. If that is true, then these findings do not weaken the assumption that inferior intelligence is an important cause of delinquency. On the other hand, it is just as logical to suppose that low social status is at least in part the result of environmental rather than native factors, and that the low social status is one of the causes of low intelligence. Obviously we need extensive experimental and statistical study to determine the validity of these two hypotheses. The few that have been already carried out indicate, as we saw in chapter four, that both native and environmental conditions are factors in the test performance.

To summarize, Slawson's studies show that it is impossible to argue that there is a direct causal relationship between inferiority in tested intelligence and delinquency, because the low intelligence test scores may be associated rather with other factors such as racial origin and social status. These factors are extremely important, but owing to lack of exact quantitative studies the relative strength of their contributions to delinquency cannot at present be estimated. Nor can we, until we have more experimentation on the interrelationships of various factors, say to what extent social status is related to innate intelligence, or to what extent language handicap, and not poor innate ability is the cause of low test scores. Slawson's studies do indicate, however,

that inferior intelligence is a far less important factor in delinquency than has been supposed.

In addition to the experimental evidence there are certain general considerations which indicate that delinquents in general quite possibly have as good innate intelligence as non-delinquents. For one thing, it is reasonable to suppose, as has often been suggested, that it is on the whole the less intelligent offenders who get into institutions. Again, the fact that the tests are not infallible measures of native intelligence may have some bearing on the question. Our experimental data tell us only what test scores are made by the delinquents, and certainly it is reasonable to suppose that possible inferiority in culture and education causes some of the slight amount of inferiority in test performance. It is important to consider, too, that a good deal of mental defectiveness is the result of controllable environmental conditions, such as malnutrition, alcoholism, mechanical injury, and syphilitic infection.

The factual evidence which we have presented demonstrates that the assumptions of Terman and Goddard as to the importance of mental defectiveness as a major cause of delinquency are unwarranted. While some delinquent groups are of low intelligence, others are not; and such factors as nationality, social status, age, type of delinquency, and environmental conditions must be taken into account in interpreting the results. Taking delinquents as a class, we see that they appear to be only slightly inferior in intelligence tests, if at all, to the population as a whole. Perhaps the most significant finding is that test scores of delinquents show a wide and entirely normal distribution, so that even if the average score is somewhat lower than that of non-delinquents, the whole group has almost the same composition with respect to intelligence.

Innate Mental Abnormality as a Major Cause of Delinquency.—Dr. Philip A. Parsons maintains that a majority of typical criminal groups either have not the intelligence to manage their own affairs with prudence, or their mental pathology has made it impossible to adapt themselves to the requirements of normal social life.²⁰ This theory of the major importance of mental abnormality as a cause of delinquency has waxed, as the theory of the defective as a “potential delinquent” has waned.

Evidence for the theory is quoted from many sources. Parsons cites investigations showing large percentages of abnormal cases in adult groups. Dr. V. V. Anderson, in a report prepared for a committee of the New York State Commission of Prisons, quotes percentages of cases with “nervous or mental abnormalities” in reformatories and houses of correction in the East. These percentages range from fifty-eight to seventy-two. They “show not only the number of persons with intellectual defect, but include cases of insanity, epilepsy, psychopathic personality, drug deterioration, alcoholic deterioration, and other abnormal nervous and mental conditions, all of which seriously handicap the individual in his ability to adjust himself to the conditions of normal living.”²¹

In such reports are included the figures for mental defectiveness, which we have shown earlier in this chapter to be inaccurate and exaggerated. There is no attempt carefully to define “abnormal mental conditions,” nor are the methods used in making such diagnoses presented. Finally, no good evidence is given as to the hereditary character of the “abnormality.” Similar criticisms may be made of interpretations of most of the investigations on which the

²⁰ PARSONS, PHILIP A., *Crime and the Criminal*, p. 126 (Knopf, 1926).

²¹ ANDERSON, V. V. (ed.), *Mental Diseases and Delinquency*. (National Committee for Mental Hygiene, 1919.)

theory of Parsons and others is based. Concepts of the different conditions considered abnormal are as yet ill defined, methods of diagnosis are not standardized, the fact that selection enters in to affect the composition of a group is often not adequately reckoned with, and unwarranted assumptions as to the innate character of the abnormalities are made. We cannot of course reliably compare the amount of mental abnormality among delinquents with its incidence among non-delinquents until we have definite concepts and accurate methods of measurement or diagnosis of the various "abnormalities"; and even then we cannot make reliable generalizations concerning the relation of abnormality to delinquency, except on the basis of careful statistical study of large unselected groups, with all other factors than delinquency constant.

Healy and Bronner state that those who emphasize the part played by mental disease in delinquency will obtain small support for their statements from their findings. Even excluding the feeble-minded and the subnormal as well as the psychopathic, they report that 72.5 per cent of their 4000 repeated juvenile offenders were definitely normal. Of the Boston series of cases, only 3.3 per cent, including cases of epilepsy and constitutional inferiority, were found abnormal. In the Chicago series 5.6 per cent were found to be suffering from mental disorders. Healy and Bronner warn their readers that they stand firmly against the diagnosis of psychopathic personality made simply on the basis of repeated misconduct. Yet they do include among the abnormal "constitutional inferiors," who "on the background of a faulty biological make-up are great weaklings from the standpoint of character."²² Burt likewise reports but a small proportion of "definitely psycho-

²² HEALY and BRONNER, *Delinquents and Criminals*, pp. 150-153, 273-274.

pathic individuals" among his delinquents. He found only two per cent as compared with two-tenths of one per cent among the non-delinquent group.²³

Innate Emotional Instability. — General emotional instability, Burt believes, is a very important cause of delinquency: "No sooner is one form of misconduct suppressed than another springs up in its place. A child, having successfully mastered his bad temper, will presently take to wandering; cure him of his wandering and he begins to steal; break him of his stealing, and a year or two afterwards he . . . reappears as a sex delinquent. There is, as it were, at the central wellhead of the mind a fixed and irreducible pressure of emotional force, which, directly one outlet for its discharge is stopped, is obliged to find another."²⁴

In the light of our analysis of motivation we should be inclined to question this statement of a common theory. But let us see what evidence there is for a causal relationship between delinquency and emotional instability, disregarding for the time being Burt's special assumptions.

Burt himself worked out a scheme for classifying individuals on a scale of emotionality according to which the one and one-half per cent of the whole population who are most emotional are called "temperamentally defective," and the next most emotional ten per cent "temperamentally unstable." He defines the temperamentally defective as "persons who, without being intellectually defective, exhibit from birth or from an early age a permanent emotional instability, so pronounced that they require care, supervision, and control for their own protection or for the protection of others."

Using this criterion, Burt classified about nine per cent

²³ BURT, *The Young Delinquent*, pp. 540, 569-571.

²⁴ BURT, *op. cit.*, p. 493.

of his delinquents as temperamentally defective, and thirty-four per cent as temperamentally unstable. Thus he considered that nearly half his group were distinguished by profound emotional instability, and concluded that among all the innate characteristics of the delinquent, a marked emotionality is one of the most influential.

In an investigation of three hundred and forty-one delinquent girls in California, Julia Mathews rated the subjects on a scale of temperament varying from melancholic (pathological depression), through phlegmatic, calm, moderate, active, and excitable, to choleric (pathological excitability). None of the girls fell in the pathological groups. Four per cent were classified as phlegmatic, and 16.8 per cent as excitable: so that about one-fifth would fall in Burt's classification of "emotionally unstable." Mathews evidently includes still other cases when she estimates that possibly one-third of the whole group were emotionally unstable.²⁵

Owing to the inevitably subjective character of the judgments, such use of a rating scale is unsatisfactory. Even when the most careful efforts are made to obtain several independent ratings, and to subject the results to critical statistical treatment, the method is less useful than we should desire, owing to the difficulty of formulating unambiguous criteria of emotionality, and the chance that the raters, however sincere, may be influenced by a common intellectual prejudice.

The most promising advance in methods of estimating emotional instability is the psychoneurotic questionnaire, invented for adults by Professor Woodworth, and modified and standardized for use with children by Dr. Ellen

²⁵ MATHEWS, JULIA, "A Survey of 341 Delinquent Girls in California," *Jour. Delinq.*, 8: 196-230 (1923).

Mathews.²⁶ An abbreviated questionnaire, adapted for children, consists of seventy questions concerning common nervous symptoms, the answers to which are given by underlining either the word "yes" or the word "no," following the question. Sample questions are:

Did you ever run away from home ?	Yes	No
Do you every cry out in your sleep ?	Yes	No
Do you feel that you are a little bit different from other people ?	Yes	No
Do you usually feel well and strong ?	Yes	No

The score on this questionnaire is the number of unfavorable responses. It has been shown that this score is significantly higher in groups known to be neurotic than in unselected groups. Disadvantages of the questionnaire, especially when used with delinquents, are that the questions related to sex are omitted as unsuitable for group examination of school children, that the subjects may not always give honest answers, and finally that the diagnostic significance of all the separate questions has not been sufficiently investigated. To illustrate the last objection, the writer found that of two hundred and fifty students taking a course in child psychology, over half gave an affirmative (unfavorable) answer to one of the questions, "Do you ever have the feeling as if you were falling just before going to sleep ?" On the other hand the questionnaire has the advantages of uniformity and objectivity in giving and scoring, and has yielded helpful results. It is the best method of measuring emotional instability at present available.

Slawson, again, making use of the Woodworth-Mathews questionnaire, has made the best study to date of the relation between delinquency and emotional instability.²⁷ He

²⁶ MATHEWS, ELLEN, "A Study of Emotional Stability in Children," *Four. Delinquency*, 8: 1-40 (1923).

²⁷ SLAWSON, JOHN, *op. cit.*, chap. iv.

found that there was a great deal of variability, in the three institutions tested, in individual performances. For example, at the New York House of Refuge the number of symptomatic responses ranged from zero to over sixty, meaning that some boys made practically no unfavorable responses, while for others the per cent was as high as eighty-seven. But where the delinquent group as a whole was considered, it was found that for each age the delinquents on the average gave a strikingly higher number of symptomatic responses than the unselected boys examined by Mathews. Had the performance been the same, on the average, the scores of fifty per cent of the delinquent boys would have been at or below the normal median. As a matter of fact only 15.6 per cent were below the normal median, indicating decidedly inferior emotional stability on the part of the delinquents, since a high score means a large number of unfavorable responses.

In an effort to determine whether this inferiority in performance was related to the factors of race or nationality rather than to delinquency, Slawson analyzed the scores as he did in the case of intelligence. While the Italian boys made a decidedly more unfavorable score than the others, there was no significant difference between the performances of the Hebrew and American groups, and the latter, which made the best showing, was still very decidedly inferior to the unselected group. Further, while Mathews had found that of two hundred and thirty-one nervous boys at a Hebrew orphan asylum, forty-four per cent were below the normal median, only nineteen per cent of the Hebrew delinquent boys were below the median. Hence the factor of race and nationality seems clearly not to be important in determining the high instability scores of the delinquents.

That social status is not an important factor in the re-

sults is indicated, Slawson believes, by the fact that only nineteen per cent of the boys at the Hawthorne School fell below the Mathews median, as compared with forty-four per cent of the boys from the Hebrew orphan asylum, who were presumably of similar social status. If inferior social status is likely to be associated with a high psychoneurotic score, this conclusion is justified. In any case it seems that although satisfactory objective study of the rôle of social status, as of nationality, was not possible, still there is some good positive evidence that these factors are not important in determining the preponderance of unfavorable scores among the delinquent boys. In other words, the inferiority in emotional stability scores appears to be directly associated with the delinquency.

If we assume that the Woodworth and Mathews inventories are fairly reliable measures of something which can helpfully be called emotional instability, we may conclude that such instability may be an important factor in delinquency. The conclusion is given support by investigations in which rating scales and other means of estimating emotionality were used. Further perfection of methods of measurement, more careful standardization, and more extensive experimental study are all urgently needed.

We must question, however, the assumption made by Burt and other psychologists that this instability is innate. The argument, that in certain persons the emotionality is permanent and innate because it has been present from an early age, is unjustified. Recent advances in psychology have shown the possibility of early, extensive, and lasting emotional conditioning. They have also called attention to the importance of undesirable physiological conditions (due to fatigue, use of drugs, poor nutrition, and the like), in relation to emotional states. Finally, we know that

mental stress or conflict, produced by the steady pressure of a hard environment or by special shocking events, may result in tension and in nervousness which may dominate a person for years or even for life.

We shall later cite studies showing an undue prevalence of poor home conditions among delinquent as compared with non-delinquent groups, and it is just such conditions, we might suppose, which would be likely to produce "nervousness" in children from an early age, or even practically from birth. Mathews found that more than half of the three hundred and forty-one girls she studied came from homes broken by divorce or death. Sixteen per cent had lived from one to ten years in institutions. In the case of many of the girls, parents had contributed directly to the delinquency. For example, four of the fathers were then serving sentences for statutory offences against the daughters, and, says the author, several others should have been. Fearing found that of eighty-eight delinquent boys diagnosed as psychopathic only one-third lived at home with the parents. This percentage of broken homes (sixty-six) is to be compared, as we shall see shortly, with a percentage of about fifty for delinquents in general and about twenty-five for the population as a whole. The parental situation seemed more definitely related to the psychopathy than the general character of the home. Twenty per cent of the psychopaths and only fourteen per cent of the twenty normal delinquents came from homes rated above the average by the Whittier scale for grading homes.²⁸

A careful analysis made by Slawson of the responses to particular questions in the Mathews inventory revealed a significant prevalence among his delinquent boys of symp-

²⁸ FEARING, F. S., "Some Extra-intellectual Factors in Delinquency," *Four. Delinq.*, 8: 145-153 (1923).

toms which could reasonably be interpreted as resulting from unfavorable home conditions. These included running away from home and the desire to do so, the wish that the subject were dead, the wish that he had never been born, and the feeling of the subject that his family did not treat him right. These and other neurotic symptoms might of course be explained as due to a native factor — perhaps other boys under the same environmental conditions might not have reacted thus. But the point is that an environmental explanation is just as reasonable. Doubtless both hereditary and environmental factors play a part in emotional instability in varying proportions, according to the individual case.

ENVIRONMENTAL CONDITIONS AS CAUSAL FACTORS IN
DELINQUENCY

IN PRESENTING the evidence for the causal importance of environmental conditions, we shall deal with those general conditions listed by Burt in his careful comparative study of a delinquent and a non-delinquent group of presumably the same social status.

Poverty. — Breckinridge and Abbott found that thirty-eight per cent of five hundred and eighty-four delinquent boys and sixty-nine per cent of one hundred and fifty-seven girls came from homes rated by the investigators on the basis of a study of family schedules as very poor. None of the homes could be classified as very good or wealthy.²⁹ Burt finds that eighteen per cent of his delinquents fell below the margin of a bare subsistence — one child in six was thus in want of the common necessities of life. Only eight per cent of the non-delinquents lived in such poverty.

²⁹ BRECKINRIDGE, S. P., and ABBOTT, EDITH, *The Delinquent Child and the Home*, pp. 70-74 (Charities Publication Committee, 1912).

Thirty-seven per cent of the delinquents came from the class of the moderately poor, as compared with only twenty-two per cent of the non-delinquents.³⁰ Healy and Bronner found in 2000 Chicago cases that about twenty per cent belonged in the class of the very poor.³¹ They agree, how-

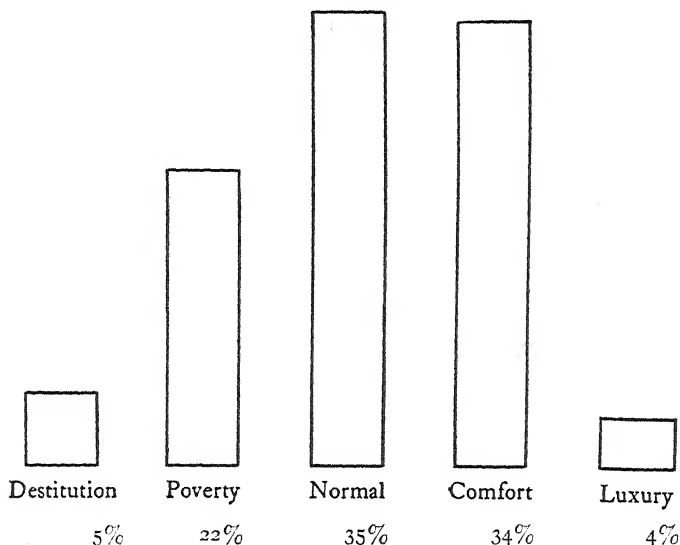


Fig. 22. ECONOMIC STATUS OF SIX HUNDRED AND SEVENTY-FIVE DELINQUENTS

Adapted from Healy and Bronner, *Delinquents and Criminals, their Making and Unmaking*, p. 120. (Copyright by The Macmillan Company, 1928. Used by permission.)

ever, with Burt in finding all economic classes well represented among delinquents, and they say that the distribution among delinquents is similar to that for the population as a whole. (See Fig. 22.)

Of course even if it should be established that there is

³⁰ BURT, *op. cit.*, pp. 62 and 65.

³¹ HEALY and BRONNER, *Delinquents and Criminals*, pp. 117-121.

much more poverty among delinquents than among non-delinquents that would not prove poverty to be a causal factor in delinquency. Both the poverty and the delinquency might be, theoretically, results of an underlying condition or conditions, such as alcoholism or mental defectiveness, although it would seem unlikely that either poverty or delinquency could be so simply explained.

But while the figures we have lend no strong support to a traditional theory that poverty is a major cause of delinquency, there is no reason for supposing that conditions connected with poverty do not often play an important part. Burt, like Dr. Miriam Van Waters³² and other writers, presents cases which clearly show the influence of want. He describes, for example, the case of two young orphans whose petty robberies were the results of hunger alone, and ceased as soon as they were well fed. He also cites cases in which, in his judgment, the concomitants of poverty, overcrowding and lack of recreation at home, are major or minor factors in the delinquency.

Defective Family Relationships. — Healy and Bronner find from data on 4000 cases that in only a little over half were both parents living and at home.³³ This cannot be true, they think, in an unselected group, and the figures of others bear them out. Shideler, on the basis of study of the 1910 census returns, estimates that 25.3 per cent of all children in the United States live in homes broken through death, separation, divorce, insanity, or imprisonment, while 50.7 per cent of delinquent boys come from such homes.³⁴ Burt's figures on this point are strikingly similar. He finds such defective relationships as causal factors in fifty-eight per cent

³² VAN WATERS, MIRIAM, *Youth in Conflict* (Republic Co., 1926).

³³ HEALY and BRONNER, *op. cit.*, p. 122.

³⁴ SHIDELER, E. H., "Family Disintegration and the Delinquent Boy in the U. S.," *Jour. Crim. Law and Crim.*, 8: 714-717 (1918).

of the delinquent group, twice as often as they occur among the non-delinquents.³⁵

Slawson compared 1649 delinquent boys in four institutions in New York with 3198 public school children representing various social levels, in regard to marital relations of the parents.³⁶ He found that in the case of 45.2 per cent of the delinquents one or both parents were dead, or the parents were separated or divorced. In his group of public school children either the father or mother of 15.2 per cent of the group was dead, and a total of 19.3 per cent were of "abnormal parental relations" (came from broken homes). Thus there were 2.3 times as many boys of abnormal parental relations among the delinquents as among his unselected group of New York City school children.

Upon analyzing the incidence of abnormal parental relations in the control group of school children, Slawson found that there was a greater incidence of these abnormal relations among those of inferior social status. He also recalled his previous finding that there was a preponderance of boys of inferior social status in his delinquent group. Using special statistical methods he had found a "coefficient of colligation" of $+.30$ between abnormal relations of parents and delinquency. Now, reasoning that part of this relationship might really be a relation between inferior social status and delinquency, he calculated the coefficient of colligation based on a comparison between the *inferior* non-delinquent group and his control group, and found it to be only $+.16$. This still, however, indicates a significant relationship. Besides, Slawson points out that it is very likely not quite fair to assume that the social status of the delinquents is as low as that of the very inferior control group, and the findings

³⁵ BURT, *op. cit.*, pp. 51, 90-92.

³⁶ SLAWSON, JOHN, "Marital Relations of Parents and Juvenile 'Delinquency,'" *Jour. Delinq.*, 8: 278-286 (1923).

in regard to the economic status of delinquents reported in the preceding section lend weight to this point.

Slawson's study at the same time calls attention to the need for extensive research with very careful statistical analysis and supports the theory that the "broken home" is an important factor in juvenile delinquency. Other investigators, working under varying conditions, report similar findings.³⁷ Clearly there is a significant relationship between broken homes and delinquency. To what extent and in what way that relationship may be dependent on other common factors such as alcoholism, economic status, and the like is not known. Future statistical study should throw light on the problem.

Defective Discipline. — Healy and Bronner found that in forty per cent of the homes of their 4000 boys and girls parental neglect or lack of control was a feature of the home life.³⁸ Burt observed defective discipline in the families of eighty per cent of his delinquents, and in only eleven per cent of the non-delinquent group. He considers discipline defective when it is too strict, too lenient, or virtually non-existent. "Of all environmental conditions," says Burt, "indeed of all the conditions whatever that find a place in my list of causes, the group showing the closest connection with crime consists of those that may be summed up under the head of defective discipline."³⁹

These findings are ambiguous. It would be difficult to measure defective discipline objectively. Whether the connection is causal or concomitant is of course not clear. The

³⁷ See for example BRECKINRIDGE and ABBOTT, *op. cit.*, pp. 90-104, both for statistics and for illuminating citation of cases. For a good general discussion of motivation in children from broken homes, see GUIBORD, ALBERTA S., "The Handicap of the Dependent Child," *Survey*, 44: 614-616 (1920).

³⁸ HEALY and BRONNER, *op. cit.*, p. 125.

³⁹ BURT, *op. cit.*, pp. 63, 92.

relation between this and such factors as abnormal parental relationships should be worked out.

Vicious Home.—The deliberate training of a child in criminal conduct Burt finds extraordinarily rare. But vicious examples are common. There is four times as much sexual immorality, he states, in delinquent as in non-delinquent homes, nearly three times as much drunkenness, and six times as much quarreling. Altogether the frequency of vicious home conditions in the delinquent group is five times that in the control group.⁴⁰ Healy and Bronner find excessive quarreling in the homes of twelve per cent of their cases, and alcoholism, immorality, or criminalism in twenty-one per cent. As a check on the negative findings, the authors made a special investigation of 1000 cases each in Chicago and Boston to determine in how many homes of delinquents really good family conditions prevailed. "If we ruled out . . . poverty, great crowding or very insanitary surroundings, extreme parental neglect or extreme lack of parental control, excessive quarreling, alcoholism, obscenity, immorality, or criminalism, mother away working, mentally diseased parent in the home . . . there were living under reasonably good conditions for the upbringing of a child, only 7.6 per cent."⁴¹

Although we could cite other studies besides these showing the prevalence of bad home conditions in the families of delinquents, this evidence would not be very satisfactory from the statistical point of view, because of the lack of control groups, the use of non-comparable methods, and inadequate analysis and measurement of "vicious conditions." Even where we do have figures based on careful analytical study, these may not reflect very well the actual significance

⁴⁰ BURT, *op. cit.*, p. 63.

⁴¹ HEALY and BRONNER, *op. cit.*, pp. 127, 129.

of the complex home conditions which prevail. Quite possibly most of these conditions are not suitable for statistical treatment, and their importance can best be brought out by the case-study method.

Bad Companions. — Healy and Bronner believe that a large share of all delinquency among juveniles is a companionship affair. They state that in sixty-two per cent of 3000 cases companionship could fairly be regarded as a causative factor in the delinquency.⁴² Burt believes that there is a tendency to take too seriously the claims of the offender as to the influence of a companion. He finds bad companionship in eighteen per cent of his cases, one of the largest figures for the causes he lists, but thinks companionship usually plays a minor rather than a major rôle in the delinquency.⁴³ C. R. Shaw found in Chicago that ninety-one per cent of 6466 unselected cases of stealing involved two or more participants.⁴⁴ It would seem to be difficult to secure accurate statistics on this factor in delinquency, although its importance in individual cases at least is clear.

Undesirable Recreational Facilities. — There is much discussion by writers on delinquency of the bad effects of too much or too little recreation. The problem is undoubtedly an important one, but the conditions are complex and statistical study so far has not furnished satisfactory results. A few findings are, however, of interest. Healy and Bronner found poor recreations in twenty per cent of their 2000 Boston cases; and street life in excess appeared as a bad feature in fifteen per cent of the boys and two per cent of the girls. To their surprise they found that moving pictures seemed to have very little effect in the production of delin-

⁴² HEALY and BRONNER, *op. cit.*, p. 179.

⁴³ BURT, *op. cit.*, pp. 123-124.

⁴⁴ THOMAS, WILLIAM I., and THOMAS, DOROTHY S., *The Child in America*, p. 546 (Knopf, 1928).

quent tendencies, and attributed only one per cent of the cases to this cause.⁴⁵ Burt also believes the bad effects of the "cinema" are exaggerated. On the whole Burt's statistics show no significant differences as regards excessive or defective facilities for amusement, between the delinquent and non-delinquent group.⁴⁶

Breckinridge and Abbott, in their chapter "The Child without Play," present a delinquency map of Chicago, showing that the most conspicuous centers of delinquency are in the congested wards which lack adequate facilities for recreation, such as parks. Less than half of a group of eight hundred and thirty-two delinquent boys lived within accessible distance of such places.⁴⁷ A group of sociologists studying regional influences in Chicago has computed the rate of delinquency, that is, the number of boys out of every 1000, between eleven and seventeen years of age, who were arrested and brought into police stations during an eighteen months' period. Calculating the rate in mile units beginning in the heart of the business district and extending through transition zones into the residential and suburban areas, they found it to be four hundred and forty-three per 1000 in the first mile unit, fifty-eight in the second mile, twenty-seven in the third mile, fifteen in the fourth mile, four in the fifth mile, and none in the sixth or seventh miles. In the first, most congested half-mile, over half the boys were brought into the juvenile court during the eighteen months.⁴⁸

Conditions of Work.—Van Waters points out forcefully, without the aid of statistics, various ways in which economic activities run for profit may and do in some cases

⁴⁵ HEALY and BRONNER, *op. cit.*, p. 181.

⁴⁶ BURT, *op. cit.*, p. 125.

⁴⁷ BRECKINRIDGE and ABBOTT, *op. cit.*, pp. 150, 154.

⁴⁸ THOMAS and THOMAS, *op. cit.*, pp. 544-545.

produce delinquent tendencies or actual delinquency.⁴⁹ Burt finds uncongenial employment or lack of employment nine times as frequently in the delinquent as in the control group.⁵⁰ Healy and Bronner find vocational dissatisfaction to be a direct cause of delinquency in three per cent of 2000 Boston cases.⁵¹

We need, of course, more investigation of the relation between vocational dissatisfaction and such factors as abstract intelligence, social status, and emotional stability.

Uncongenial School. — Healy and Bronner fix dissatisfaction with school as a major cause of the delinquency in nine per cent of their 2000 Boston cases, although this held of only two per cent of the girls.⁵² Burt finds uncongenial school conditions much more frequent among the delinquents than in his control group, and believes that in seven per cent of his cases of school age, the influence of an uncongenial school may be the sole or preponderant factor in the wrongdoing.⁵³ Van Waters thinks that the school has important responsibilities in relation to delinquency, and again gives vivid and concrete illustrations.⁵⁴ These findings are suggestive in connection with Slawson's figures on the marked inferiority of his delinquents in abstract but not in concrete intelligence. Slawson says that if intelligence does play a part in producing delinquents, it may well do so through the schoolroom where abstract and verbal material is chiefly dealt with, and pupils who do better in concrete situations are at a disadvantage.⁵⁵

⁴⁹ VAN WATERS, *op. cit.*, chap. iv, "Conflict in Industry."

⁵⁰ BURT, *op. cit.*, p. 125.

⁵¹ HEALY and BRONNER, *op. cit.*, p. 182.

⁵² HEALY and BRONNER, *op. cit.*, p. 181.

⁵³ BURT, *op. cit.*, pp. 125, 174.

⁵⁴ VAN WATERS, *Youth in Conflict*, chap. iii.

⁵⁵ SLAWSON, *The Delinquent Boy*, pp. 150, 151.

PHYSICAL OR PHYSIOLOGICAL CONDITIONS AS CAUSES OF
DELINQUENCY

WE HAVE aimed to deal in some detail with the chief general hereditary and environmental conditions which have been alleged to be major or important causes of delinquency. We shall not deal similarly with physical or physiological conditions because it is probable that no student of delinquency now believes them to be of major causal importance. English studies have shown real but not great inferiority of general physique among delinquents, as compared with normal children, but Slawson found no evidence of inferiority of size or weight among his delinquents, when such factors as race were taken into account. He did find a significantly larger percentage of sensory defects among his boys than among unselected boys.⁵⁶

In some few cases, diseases, acute or chronic, are important factors in delinquent conduct, and in others either delayed or precocious puberty is a factor. In individual cases special physical or physiological features of many different sorts, normal or pathological, may be important. In certain cases the decisive factor may be the possession of a large nose, kinky hair, or a dimpled babyish face. We may conclude, therefore, that important as physical conditions may and must be in many cases, there are no particular physical conditions so intimately associated with delinquency as to be considered important general causes.⁵⁷

⁵⁶ SLAWSON, *op. cit.*, chap. v.

⁵⁷ For a thorough discussion of physical and physiological factors in delinquency, with illustrative cases, see BURT, C., *The Young Delinquent*, chaps. v and vi, and HEALY, W., *The Individual Delinquent*, Book II, chaps. ii, iii, iv.

VALIDITY OF CURRENT CONCEPTS OF CAUSATION IN DELINQUENCY

HAVING made a brief survey of the vast amount of work which has been done in an effort to discover the causes of delinquent conduct, we are now in position to inquire how valid are the principles and concepts which have guided this work, and how fruitful it has been.

Determinism a Necessary Assumption. — In the first place, we may assure ourselves that the investigators are on sound ground in assuming that there are, for every delinquent act, antecedent conditions adequate to produce that result. The old doctrines of free choice, of an innate moral sense, of chance, and of divine intervention have no place in a scientific inquiry into conduct. We must operate on the fundamental assumption of science that every event has a cause, which in psychology may be taken to mean that every act of a human being is a natural response to an adequate stimulating situation. In the study of delinquency it is especially important for the student to recognize the value of determinism as a guiding scientific concept, since popular as well as legal tradition has made unwise use of the concepts of responsibility and of punishment. Psychologists recognize that there is such a thing as responsibility, but they would insist on a scientific analysis of its meaning and conditions; they would approve of many of the methods of punishment now in use, but would urge in many cases that it be administered in a different spirit and for a different purpose.

Relativity of the Concept of Cause. — The recognition that any delinquent act is the inevitable outcome of a definite situation has led many to suppose that there is one condition or set of conditions which constitutes the true causes of the act, all other related circumstances being merely

minor or accessory. This conception of a cause as a sort of entity does not do justice to the facts. If a delinquent act is a response to a stimulating situation, then in order fully to understand the act we must study the total situation in an effort to discover which aspects of it are actually factors in the behavior. This procedure involves an examination not only of the environment and the make-up of the individual at the time of the delinquent act, but a study of his whole past experience in so far as it has affected his present capacities, motives, and tendencies. Thus there is no absolute cause either for a single delinquent act, or for delinquency in general.

Causes are merely related antecedent circumstances, and it depends on our purposes in making an investigation what we will regard as adequate causes in a given case. Suppose a fourteen-year-old boy returning from a midnight party shoots a companion and bitterly regrets it next day. What is the cause? Antecedent conditions which might be related include among others, drunkenness, jealousy over a certain girl, laxness of parental discipline, ownership of an automobile, lack of habits of church-going, fondness for jazz music and dancing, a private school education, spoiling of the boy in early childhood, excessively strict training of both parents in their youth, the puritanical Presbyterianism of the grandparents, and the prevalence in their day of a dualistic view of the mind-body relationship.

To enumerate all the related conditions would be to give the recent social history of the age as well as of the family and social groups in which the boy moved, and the particulars of his own life history. What is the real cause of the shooting? The answer will depend upon the practical interests involved. For the parents the question of home discipline and adequate ethical training may be the most im-

portant, for the boy himself the question of adequate ideals of social life, for the lawmakers the question of regulation of the sale of liquor, and for the philosopher the effect of grandparental views on the mind-body problem. All of these interests are legitimate and all the relevant data which help to satisfy them constitute real "causes." How far we shall wish to go in the search for causes depends upon the degree of control we wish to exercise, that is, upon our purpose in making the search.

Two corollaries follow from this proposition. First, it is clear that all causation is complex, if we take any but a very superficial view. In trying to explain any single delinquent act or any delinquent career we shall expect to find many significantly related antecedent factors. In the second place, we shall not expect to understand individual cases in the light merely of general theories. The need is strikingly indicated for a very thorough and careful study of each individual case, since each human being is unique by inheritance and by experience.

Misleading Attitudes toward Problem of Heredity.

— Burt represents orthodox tradition when he says, "To discriminate what is innate from what is acquired is of paramount importance. . . What is inborn is incurable; what is merely superadded may yet be removed."⁵⁸ From the point of view of this book, however, the hereditary or non-hereditary character of the defect bears little relation to its "curability." Some antisocial activities for which there is probably a definite hereditary basis are certainly "curable." For example, "pugnacity," including tendencies to strike out with the hands, and to shout and grow angry when attacked, has in most people usually been brought well under control by the time maturity is reached; and for the primitive modes

⁵⁸ BURT, *op. cit.*, p. 401.

of reacting more socially acceptable and more generally effective forms of response have been substituted. The tendency to lay hands on anything seen and to retain it, often considered innate, is similarly controlled. As a matter of fact the only conditions important for mental life which we know to be both innate (in some cases) and incurable, are feeble-mindedness and certain special sensory or motor defects.

These are, however, just as impossible of cure if they have been acquired. We cannot restore sight to one whose eyes have been gouged out in an accident, or intelligence to a child whose cerebral development was arrested during the early months by malnutrition, any more than we can restore sanity to one whose cerebral cortex has been partially destroyed by paresis resulting from youthful indiscretions. In many cases no help of great practical significance for the social adjustment of the defective individual can be given, and this holds true whether the defect be acquired or inherited.

Since it is true that acquired conditions are sometimes difficult or impossible of "cure," and also that traits thought to be or known to be hereditary can sometimes be profoundly modified so far as the individual is concerned, we may conclude that the student of delinquency is likely to be hindered in dealing with an individual case, by adherence to the ill-founded theory represented by Burt. The attitude toward the possibility and means of cure should be based on a thorough study of the particular conditions in the individual case. It is the *nature of the condition found to exist*, not its hereditary or non-hereditary character, which is related to the possibility or likelihood of "cure." In no case, moreover, should the assumption that a given condition is hereditary lead to a pessimistic outlook for improvement.

From the point of view of *prevention*, however, it is important to determine as exactly as possible not only what factors in undesirable conduct may be chiefly determined by germ-plasm heredity but what ones are largely the result of prenatal and postnatal experience. This knowledge might help us to control delinquency indirectly through preventing procreation on the part of individuals with transmissible defects such as some kinds of feeble-mindedness, or syphilis, though such measures should be utilized only where accurate knowledge as to the transmissibility of the condition exists. But for modes of behavior known to depend on experience, the chief means of prevention would be so to control the environment and direct the training that the undesirable conduct will not develop.

CHAPTER XIII

FACTORS IN THE GENESIS AND CONTROL OF ANTISOCIAL CONDUCT

IN THIS chapter we shall still be mainly concerned with juvenile delinquency, but we shall not restrict ourselves so closely as in the last chapter to the treatment of acts which are technically delinquent. We shall see that much mildly antisocial and merely unethical conduct has the same origins as delinquency, and it will be clear by implication that it rests on the same bases and is to be understood in the light of the same general principles.

For the student of general child psychology the problem of accounting for the development of what may be called professional child delinquency is not of primary importance. In the first place it seems to be very rarely indeed that children are deliberately trained for delinquent careers, the suggestions in movies and certain novels to the contrary notwithstanding. There is, it is said, a well-organized underworld with codes and standards of its own, varying according to the trade and social status of the groups concerned. Thomas and Thomas say that in Chicago criminal life is as definitely organized as the public school system.¹ But if the members of this criminal society teach their chil-

¹ THOMAS, WILLIAM I., and THOMAS, DOROTHY S., *The Child in America*, p. 550 (Knopf, 1928).

dren the tricks of the trade, it must be that the superior training of these children enables them usually to escape detection, since they so seldom appear in the juvenile courts. Another reason for leaving out of account professional child delinquents is that the matter of accounting for their delinquent trends would present no special difficulties for the psychologist. It would be merely a matter of the organization of technical skills along with the acquisition of the ideas and standards common to the social group surrounding the child. Such mental growth would be entirely ordinary. One would not expect an undue amount of mental conflict, for conflict arises when the desires or habits of the individual are sharply opposed to those of the social group. The delinquent conduct under these conditions would even be, strictly speaking, moral conduct, for the moral is the customary.

But speculation about child training in the underworld is vain in any case, considering our ignorance of social conditions in that world. It is not unreasonable to suppose that even most professional crooks do lip service to the traditional morality, and like ordinary people leave their children to grow up as they may. So that if habits of delinquency are acquired, it seems rather to be, as Burt says, through example than through precept, and because these habits represent the most natural modes of adjustment under the circumstances of the individual's life. Besides, four-fifths of Burt's juvenile delinquents came from families in which there was no history of definable crime.²

For present purposes we shall disregard not only professional delinquency but also cases of accidental or purely impulsive antisocial behavior which is not characteristic of the individual or likely to be repeated. For example, a little

² BURT, CYRIL, *The Young Delinquent*, p. 50 (Appleton, 1925).

four-year-old boy while playing with his cousin accidentally cut her arm with a kitchen knife, inflicting serious injury. There is no special problem involved in such conduct. We may likewise disregard cases of sporadic wrongdoing under stress of unusual circumstances, as for instance, when a boy, thinking his mother attacked by the father, rushes to her aid and in so doing deals the father a mischievous blow.

What we are interested in at present is in trying to understand the origin of habits of antisocial conduct which persist for varying lengths of time. Such trends, we may take it, represent acquired modes of adjustment to conditions of living. How does it happen that such habits are acquired, rather than other modes of response? We can answer this question in general terms through a reconsideration of the learning process in the light of what we know about juvenile delinquency. As in considering sensory-motor learning and again in dealing with thinking and reasoning, so now in trying to explain the origin of delinquent behavior we shall find it helpful to make our analysis on the basis of the factors in the learning process so cogently developed by Carr in connection with the problems of animal behavior.

We can see more clearly how these factors operate by describing a concrete case to which we shall later refer, a case studied with their usual thoroughness by Healy and his staff. Abigail Hardell, sixteen years old, was brought to court charged by the staff of the Boston People's Institute with stealing two hundred dollars from their Christmas Savings Club. She had confessed to some earlier stealing of clothing and jewelry, and it was known that she must have been lying and fabricating extensively previous to this last theft. She was an attractive, healthy girl of normal mentality, and although she had a very poor social background, she had impressed the Institute workers as wholesome and

trustworthy. She was the youngest of several children. Her mother, an excessively religious, stern, and parsimonious native of Vermont, had left the drunken husband when Abigail was four, and had since that time supported the family alone. They were now living in Boston in a cheap tenement. The mother, who believed all pleasure was sin, was a scold who talked continually of money and beat even her grown-up daughters. The girls wore made-over clothes and saved in every possible way. There was some minor delinquency and running away among the older sisters.

Abigail for the last four years had frequented the Institute, taking full advantage of the recreational facilities and going to the camp each summer for a short vacation. Now in the second year of high school, she was only a fair student, but was interested in her studies and the school activities. Her written compositions were unusually good.

The girl did not deny taking the two hundred dollars from the Institute, but lied about the details of its disposition. She was known to have spent a large part of it on clothes for herself, and some for a present for an older girl on whom she had a "crush." She had recently been making false charges for supplies, and had stolen and lied to people at the Institute.

It was found that though at one high school Abigail had been a leader, at the next she was thought "stuck up." The last summer she had made herself so disagreeable in camp in that respect that she had to leave. Because she considered herself superior to other girls from the tenement district she antagonized them. She was critical in the Institute Clubs, often finding things wrongly done. "It came to light that to her companions and in the schoolroom Abigail had been indulging in well-concocted fabrications. She had told tales of rich relatives, of an uncle who had a large estate

near Manchester, Vermont, where so many wealthy people live, and of how sometimes he drove down to Boston to see them, always putting up at the Copley-Plaza. And to some she declared she was engaged to a young Vermonter who was an officer in the army and wealthy. Once she came home with a bouquet of violets and orchids (this was about the time when she had the stolen money) and said that it had been given to her at a party where she was the guest of honor. In the schoolroom one day she burst into tears and gave a graphic description of the heroic death of her father at Ypres." (As a matter of fact her father was alive and, she had every reason to think, living a miserable life.)

Abigail herself denied ever having taken anything until the preceding summer, when she had stolen clothing from a high grade shop where she worked. The other girl who worked with her in the specialty shop had talked about how unfair it was that wealthy people could come in and buy all these lovely things, more than they needed. Abigail remembered conditions in a well-to-do family where she had worked. At the Institute the idea of taking the money came like a flash, and she took it at once without thinking what she would do with it. She was not boy-crazy and had not been worried by sex ideas. She did not worry about her father, she said; why should she, he didn't worry about them. She did feel badly sometimes about the way she had to dress. During this interview Abigail confessed part of her delinquencies, but it came out later that she had concealed some incidents and lied about others.³

³ *Judge Baker Foundation Case Studies*, Series I, case 12, March, 1923.

ANALYSIS OF FACTORS IN THE GENESIS OF ANTISOCIAL CONDUCT

Motivating Stimulus. — We may assume that any more or less persistent course of action is a response to some stimulating situation which recurrently dominates behavior until it is in some way satisfied. This simply goes back to the basic psychological principle that every act is directly or indirectly a response to a stimulus. We saw in a previous chapter how persistently certain fundamental physiological motives keep stimulating the organism until something is done to relieve or put an end to that stimulation; and how through continued learning acquired motives of many different kinds may similarly dominate an individual. We saw that motivation through learning becomes exceedingly complex, that many motives characteristically operate on an unconscious level, and that motives of which the individual is sometimes conscious may at other times play a part in determining his behavior although he is entirely unaware of their influence. Perhaps the most important point made, in relation to our present interest, was that the strength of a motive is apt to be proportional to the degree of thwarting to which it is subjected.

There is no special reason to suppose that the physiological motives of hunger and of sex, or other tissue needs, are particularly prominent in delinquent as compared with non-delinquent behavior. It is true that there seems to be somewhat more poverty among delinquents, but on the whole, if we can judge by physical measurements, they are as well fed as non-delinquents, taking the population as a whole.⁴ As for sex, most psychologists do not question its importance in the motivation of normal children, and it

⁴ SLAWSON, JOHN, *The Delinquent Boy*, chap. v, pp. 270-349 (Badger, 1926).

would be hard to show that it is any more influential in delinquents.

The actual study of thousands of delinquents by Healy and his staff reveals the fact that the delinquency of an individual is likely to be related to a very complex and shifting set of motives, in which, however, some are dominant. Such a case is that of Harry Harmond, an emotionally unstable boy, brought up in several foster homes, most of them poor. His delinquency took many forms, but through them all we can see the influence of persistent special motives — particularly of the desire for love from his father, of shame connected with early sex experiences, and of craving for a “real” home. When the chief of these motives were satisfied in a sympathetic foster home, he became a different boy. Incidentally the pathological mental deterioration which had been predicted by an expert did not occur.⁵ In the case of Abigail the motivation seems simpler. Dissatisfaction with home life, fostered by knowledge of better and grander ways of living gained in school and at the Institute, led to specific desires for clothes, wealth, and cultured companions, desires which, consciously or unconsciously, increasingly dominated her.

Hartshorne and May have shown by statistical study some of the probable motivating factors in milder antisocial conduct.⁶ They devised and carefully standardized objective methods for measuring different types of deceptiveness. For example, school cheating was measured by allowing pupils to correct examination papers of which literal copies had previously been made, so that all changes were detected. Home cheating was measured by comparing performance on a word-knowledge test which the pupils, having been

⁵ *Judge Baker Foundation Case Studies*, Series I, case 12, March, 1923.

⁶ HARTSHORNE, HUGH, and MAY, MARK A., *Studies in Deceit*, Book I, pp. 181-189; 391-401 (Macmillan, 1928).

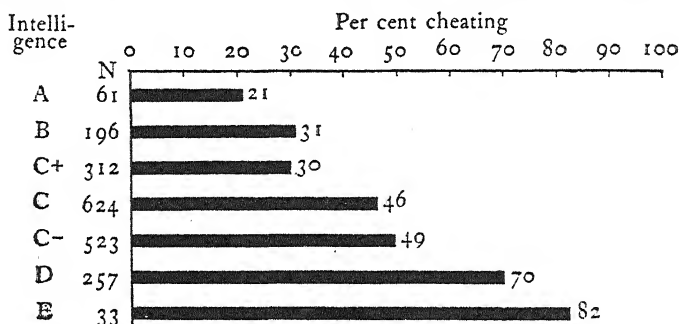
told to get no help from any source, were allowed to take home, with performance of the same pupils on a different form of the same test given under "honesty conditions" at school. Cheating in athletic contests and in party games was also objectively measured by ingenious tests, and so were lying and stealing in different situations.

The results of the cheating tests as given to several thousands of children in grades four to eight show, in the case of school tests involving arithmetical and other academic abilities, a very striking negative relation between amount of cheating and general tested intelligence. Figure 23 shows the per cent of cheating among the total school population tested, A representing the highest scores in the intelligence tests and E the lowest scores. It was found that there was no such relation between intelligence and cheating at parties, as shown in the second diagram in the figure. These relationships were unaltered when social status was taken into account—that is, within a given social status the brighter children still cheat less.

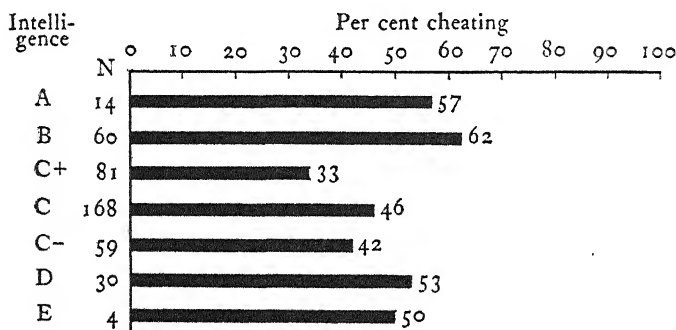
It is reasonable to suppose, as Hartshorne and May do, that the desire for good marks, in connection with opportunity to cheat and inferior ability to get those marks, is a basic motive in the deception. In a social situation the intelligent might be supposed to be as often at a disadvantage as the less intelligent, and hence to be tempted as often to cheat. But the situations are not simple. The authors insist on the complexity of the motives for deceit, and on their variability in accordance with the situation. In the case of any antisocial conduct whatever we should expect complexity and change in motivation according to the circumstances. It is not that there is usually a general tendency to deceive or to engage in any other kind of undesirable conduct, but that the nature of the total situation at a given

time is such that, certain motives being present, this behavior is likely to result.

Existence of a Problematic Situation. — If some of the many things which a child either quite obviously needs, or



Per Cent Cheating on School Tests at Each Level of Intelligence



Per Cent Cheating at Parties at Each Level of Intelligence

Fig. 23. INTELLIGENCE AND AMOUNT OF CHEATING AT SCHOOL AND AT PARTIES

From Hartshorne and May, *Studies in Deceit*, Book I, pp. 183, 185.
(Copyright by The Macmillan Company, 1928. Used by permission.)

"needs" because he thinks he must have them, are persistently wanting, then the child is confronted with a problematic situation. Of the true nature of the situation he may

in some cases be as ignorant as the white rat is of the maze problem, but like the white rat he will keep on acting in response to the total situation, so long as the motive continues to affect him, and so long as nothing happens to change the problematic situation and weaken or remove the motive.

Problematic situations arise not only from lack of objective "satisfactions," such as food, money, or works of art, but as a result of conflicting impulses with regard to such objects. In case studies of juvenile delinquents we find over and over again signs of common types of conflict—conflict between the desire to steal and the wish to be true to an ideal of honesty; between the impulse to masturbate and the horrified shrinking from it instilled by training; between tendencies to dislike and to run away from foster parents and the desire to be loyal to them. A striking example of persistent conflict is the case of Abner, referred to in the first paragraph of the chapter on the causes of delinquency. At the age of twelve he was a chronic thief, taking "everything he could lay his hands on," but according to his mother often tremendously sorry for his misdeeds. A thorough analysis of the case revealed the fact that the boy had engaged in bad sex practices with girls, and that apparently both the stealing and the sex practices had started at about the age of six. Abner said, "I don't understand about it yet. I was always wondering about it. I think about it when I am sleeping; I mean I dream about it. I dream that girls always want me to do it." He also had had trouble with his stepfather at home. After the review of his case Abner tried desperately various ways to reform but frequently backslid when "a sort of wave" came over him. It was after two years of this struggle that he committed suicide.

Healy and Bronner report a history of mental conflict in six per cent of their four thousand cases, and they say it is likely that many a conflict was undiscovered.⁷ Judging by his analysis of cases, Healy is evidently using the term conflict in a restricted sense, as referring to cases in which some repressed or unconscious factor is continually leading to unhealthy impulses conflicting with more normal ones. The way in which such a conflict may operate is illustrated in the case of Douglas Darrant, a boy of very superior intelligence and excellent family who at twelve was found to have been guilty of much stealing and of running away from home. It was discovered that Douglas had never stolen prior to an incident two years before in the office of a flour mill, when a crowd of boys had been talking about bad sex habits with girls, and one of them had stolen some money from the cash drawer. Off and on after that Douglas took things. It seemed strange, he said; he didn't know why he did it—he would just suddenly feel like taking a thing, and would do it. In these last two years he had been very restless (puberty was somewhat premature), and had slept very badly. Before he went to sleep he often masturbated.

In telling about his masturbation Douglas burst out suddenly, "It's that, starts me thinking of stealing." Questioning brought out the statement that as he lay in bed pictures came into his mind—many kinds. Sometimes there were pictures of girls—about underwear and stockings. Another boy, who stole, had told him about such pictures, and talked about girls' legs. Since then Douglas had often looked at magazines to find pictures of that sort in the advertisements. Further questioning also brought out the point that

⁷ HEALY, WM., and BRONNER, AUGUSTA, *Delinquents and Criminals, Their Making and Unmaking*, p. 180 (Macmillan, 1928). See also HEALY, WM., *Mental Conflicts and Misconduct*, p. 213 (Little, Brown, 1917).

about two years before, on the farm, he had had an affair with a little girl of the sort the boys told him about, and he remembered that sometimes, but not often. Healy asked him for a description of how he felt when he stole things, and he said he always felt very restless, that he had just got to take something, no matter what it was, and then he would feel better. When he was asked if it was like any other feeling he had, he thought for a moment with a very serious expression and said, "Sure, it's just the same as when I want to touch myself, as if I did it I would feel better."⁸

It is clear that in this case the stealing has become, because of these experiences, one of the trial-and-error modes of satisfying the sex motive. If sexual fantasies, masturbation, or looking at certain pictures are not indulged in, stealing may bring relief because of its strong association with definitely sexual activities. The main conflict in this case is at first unrecognized, since it is between the impulse toward bad sex behavior which operates on a subconscious level, and contrary impulses related to the boy's ethical training. There are secondary conflicts, since, for example, the boy also has acquired negative attitudes toward stealing, but these are subordinate, and the stealing occurs as an easy alternative to the other behavior, so impossible to the boy that it is not even thought of. Another reason for failure on the part of even this bright and "fundamentally right-minded" boy to see the reason for his behavior lies in the fact that the organic stimuli of sex do not always, even in boys, give rise to definitely identifiable sensations, but simply to a vague feeling of restlessness.

Such behavior as the above we should expect to be very difficult to control until the conflict is explored, and the situation understood by the individual. The reason is that cure

⁸ *Judge Baker Foundation Case Studies*, Series I, case 5, October, 1922.

would necessitate the substitution of better ideas and attitudes for the undesirable ones, which can hardly be done so long as it is not even known what is the basic stimulating situation, nor just what are the undesirable impulses for which others are to be substituted. In the case of a boy as intelligent as Douglas reëducation on such a point is possible. In that particular case it was highly successful.

The psychologist, aware of the baffling intricacy of mental life with its tangle of motives and its many unconscious factors, an intricacy related to the wealth of experience which any child even a few years old has had, will not be surprised to find hidden conflicts at work, and often, even in non-delinquent children. Children not infrequently go through emotional experiences which to an adult are ordinary enough, but to a child terrifying or shocking, and there are formed "unconscious complexes," "repressed ideas," or attitudes which on certain occasions influence conduct, but of which the child himself is not clearly aware. When these non-integrated unconscious tendencies to response are aroused, we may expect poorly integrated behavior — delinquency in some cases, perhaps, fits of depression in others, hysterical physical symptoms in still others. With improved methods of mental analysis of children, it seems likely, therefore, that we should find mental conflicts more prevalent in children than we at present dream.

In regard to the types of conflict which he found in a delinquent group of one hundred and thirty conflict cases, Healy says that other things than sex may well be basic, and gives illustrations of conflicts concerning parentage and other matters. "But," he says, "even in these instances the reader will note that my endeavor to find cases of mental conflict altogether free from emotional disturbance about sex affairs has not been completely successful."⁹

⁹ HEALY, *Mental Conflicts and Misconduct*, p. 213.

Two other findings about the special group of conflict cases are very interesting in relation to the discussion of hereditary causation in the preceding chapter. First, Healy found that the average mental ability of the conflict cases was significantly higher than the average of the whole group of 1000 recidivists in which they belonged. "The percentage of those above the class designated poor in ability is twice as great in the mental conflict group." This finding could be explained by supposing that the child with the livelier mind has on the whole a larger stock of ethical concepts to release inhibiting impulses.

In the second place, in the group of conflict cases, only four and one-half per cent were classified as abnormal, that is, either feeble-minded or psychotic.¹⁰ We may compare this with the fact that of six hundred and seventy-five cases, twenty-one per cent were so classified, five per cent as having psychoses.¹¹ Healy says, "If we compare this group of misdoers with others whose delinquencies are not the result of conflicts, we find no marked difference between the average mental make-up. . . [Moreover,] there is no good evidence that our instances of conflict have arisen upon any specific hereditary basis. If any predisposition is inherited, it is not, in general, such as may be identified and traced in any ordinary family history."¹²

While we may expect some cases of delinquency to be conditioned by deep-seated mental conflicts, perhaps of many years' standing, others will involve conflicts of a lesser degree of seriousness. Still others, probably most cases of delinquent and unethical behavior, will issue not from continued mental stress, but simply as the easiest and most natural response in a type of problematic situation which continues to recur. For example, the child who for various

¹⁰ HEALY, *op. cit.*, p. 317.

¹¹ HEALY and BRONNER, *Delinquents and Criminals*, p. 155.

¹² HEALY, *Mental Conflicts and Misconduct*, p. 313.

reasons is keenly desirous of obtaining good grades finds himself again and again thwarted by lack of knowledge or of understanding. If in such a case an answer book is near or he can look unobserved at a companion's paper, one of these responses is a natural one.

Antisocial conduct does not thus usually result from unified tendencies to certain types of wrongdoing which function regardless of the situation, but whether such conduct occurs depends upon the special nature of that situation. Hartshorne and May showed that an extremely high percentage of cheating occurred in situations in which the opportunity to cheat was purposely made very easy; while in the same group of children very few cheated when cheating was difficult or likely to be observed. Some would cheat on puzzles, but not in arithmetic tests; some in parlor games, but not in athletic contests. There was similar variability in tests of lying and of stealing.¹³ In other words antisocial conduct is a response in a problematic situation, and the response varies in the same individual in part according to the nature of the situation. Normal deceptiveness is not a unified trait which is consistently manifested by a given child. Nor is deceptiveness which is serious enough to amount to delinquency to be regarded as a trait either possessed or not possessed by the individual. Like other delinquent tendencies it is a way of acting in response to thwarted motives, and it varies not only according to the strength of the motive, but especially according to the manner of the thwarting, that is, according to the nature of the problematic situation.

Varied "Attack," or Trial-and-Error Behavior.—When an animal which is being stimulated by some per-

¹³ HARTSHORNE and MAY, *op. cit.* See especially Book I, chap. xxi. "The Specific Nature of Conduct and Attitude," pp. 377-390.

sistent motive encounters a problematic situation, it will naturally, as long as it is healthy and not too fatigued, and the stimulus keeps up, continue to do something. On any one occasion, according to the nature of the stimulating situation, the resultant behavior will include a variety of innate and learned responses which have previously occurred in similar situations.

In our treatment of motivation we described the various main types of activity, direct and indirect, which a human being may exhibit in a problematic situation. After a certain amount of fumbling, overt or ideational, an adequate direct adjustment may be made which satisfies the underlying motive. Often, however, no direct adjustment can easily be made, and in such cases various indirectly satisfying activities are likely to put an end to the trial-and-error behavior. These indirectly satisfying activities may be of the substitute or compensatory types, either overt or implicit. Rationalization may lessen the acuteness of the problem, and various forms of hysteria may enable the individual to avoid disagreeable situations. The use of alcohol and other drugs is one means of obtaining satisfaction. Suicide is another way out. Reasoning is a highly effective means of adjusting to problematic situations in which direct satisfaction is for the time being, or even permanently, out of the question. We saw that reasoning involves facing the situation squarely with a thoughtful attempt to make the best of it. It is what Bernard Hart calls the "fight to a finish," and is of course in actual practice an extremely rare mode of attack. It presupposes the possession of a wide and effective stock of social habits and concepts, together with the habit of self-criticism in the light of ethical standards — an equipment probably possessed less often by delinquents than by non-delinquent individuals.

It is clear that delinquencies often represent obvious and logical solutions of problematic situations, as for example when Burt's hungry London urchins planfully stole leavings from restaurant tables, or when poorly dressed Abigail Hardell took from the shop where she worked the pretty clothes she wanted. In many cases, however, it takes long analysis before the leading motives are discovered and the nature of the individual's problem understood. In some cases there seems at first to be no rational connection whatever between the undesirable conduct and the problem. The individual is simply restless for some reason or other, and does something bad. But, since we do not believe in born criminals, we must assume that there is rhyme and reason in the behavior. We may suppose that some definitely delinquent trends may become fixed as the characteristic way of meeting certain unpleasant situations. The delinquency may be a more or less deliberate means of expressing defiance of unjust parental or other authority. Direct retaliation being impossible, this way of "getting back" is utilized. But many cases of delinquency are not susceptible of such a simple explanation—they represent modes of response related in intricate ways to the complicated and changing situations of the individual's life.

In regarding delinquent acts as representing essentially parts of a trial-and-error attack on a problematic situation we must realize that some of the types of activity above discussed will probably occur along with the delinquent conduct. This is true of Abigail Hardell, whose romantic stories of wealthy relatives and expensive good times, along with her over-compensatory critical behavior toward her companions, represented other "errors" in the varied activity which she exhibited. Sometimes the presence in a non-delinquent child of some of these

types of indirect adjustment such as the tendency to fabricate, to daydream excessively, and to overstate one's abilities may be especially significant as indicating that there exists a situation of sufficient seriousness to warrant a prediction that unless something is done delinquent behavior may possibly develop.¹⁴

On the whole it is clear that of the various possibilities of action, delinquency is not necessarily the worst way out. At least it is direct action. Indeed, in certain cases it may indicate the existence of strong and positive personality traits, which, if reëducation takes place, may be turned to very good account.

When delinquency is thus viewed as an "error" in the trial-and-error process of adjustment, its relation to such other modes of trial-and-error response as over-emotionality and introversion is at once apparent. Moreover it is easy to see how delinquency may often be related to these other conditions, not as effect to cause, but as merely one of these common effects of the same antecedent conditions.

"Chance" Success. — The first delinquent act may, as a matter of fact, not have the effect of relieving the chief motivating situation. Or if it does it may lead to other effects, such as shame and remorse, which may constitute motives stronger than the original. If that is the case the delinquency may not be repeated. If, however, it does have the effect of satisfying the motive for the time being, and if it does not at once lead to serious effects, then we have favorable conditions for its fixation.

Abigail Hardell was not found out when she took the expensive clothes from the specialty shop. Nor did the act lead to remorse, because it was so easy to rationalize the

¹⁴ See RAUBENHEIMER, ALBERT S., "An Experimental Study of Some Behavior Traits of the Potentially Delinquent Boy," (*Psychol. Monog.* Vol. XXXIV, No. 159, 1925).

situation by reflecting how little such things meant to the owners of a shop like this, and how unfair it was for her wealthy patrons to wear such things while she had practically nothing. Nathan Leopold, a young man who is now, with his companion in crime, serving a life sentence for the peculiarly horrible murder of a young boy, excused even his crime by the rationalization that people of extraordinary intelligence are not bound by ordinary moral laws.¹⁵

Fixation. — If the commission of an antisocial or unethical act satisfies the underlying motive, and does not lead to deterrent consequences, outer or inner, then we should expect repetition, other things being equal, when the problematic situation occurs again. The school child, urged on every hand to get good grades, never to fail, is rewarded by better marks when he cheats. He cheats again. The strong emphasis put on grades and promotion in the conventional school may thus actually encourage the fixation of a habit of cheating in certain children. Hartshorne and May compared the amount of deception in a large free public school run in the conventional way, with a large free public school in the same community in which the usual emphasis on grades and promotion was lacking. It is very significant that the amount of cheating, grade for grade and for the groups as a whole, was very much less in the progressive school than in the conventional school.¹⁶ As long as Abigail's romantic stories aroused attention and interest, she told them. As long as her stealing kept her better dressed and was undetected, she stole.

With every repetition of the act, the next repetition, other things being equal, will occur more readily, and a habit will be fixated which may become powerful and dominant or be

¹⁵ McKERNAN, MAUREEN, *The Amazing Crime and Trial of Leopold and Loeb* (Plymouth Court Press, 1924).

¹⁶ HARTSHORNE and MAY, *op. cit.*, Bk. I, pp. 316-320.

utilized merely occasionally, according to the nature of the situation and the individual. After such a habit has once been formed we shall expect it to become automatized, and to tend to recur involuntarily (that is, without preceding thought) under the appropriate stimulation. This of course is the explanation of such phrases, frequently used by delinquents, as "I don't know why I do it"; "I just can't help it"; "I just see things and take them"; or "A sort of wave comes over me and I do it." Ordinary people, children and adults, who have made progress in understanding human nature, have learned that much of their own behavior is similarly non-rational, so that one of the marks of an intellectually mature person is his willingness to admit that he does not always know the reason for what he has just said or done.

Persistence of Delinquent Habits. — Just as an ordinary perceptual-motor habit, once formed, may function in the absence of the original motive, so may various habits of delinquency. This is seen over and over again in the case of juvenile recidivists, and it is what we should expect, since an act several times repeated soon tends to be elicited by a part only of the total stimulating situation in which the act was fixated. The girl who has formed a habit of stealing mainly as a response to a thwarted motive plus the sight of objects in the shops, may now steal at the mere sight of objects in the shops. She is, perhaps, a "kleptomaniac," stealing "without reason." Healy gives many examples of the illogical and unnecessary persistence of habits of petty stealing or other delinquencies. In such cases we may assume that the activity once fixated as a satisfaction of a specific motive, sometimes comes to "furnish its own drive," and is then a sort of play. The situation of the poor clerk who learns successfully to play the stock market and keeps on

long after he has become a wealthy man illustrates the same process.

This analysis of the factors in the genesis of antisocial conduct, including delinquent conduct, suggests the intricacy of the whole problem. Antisocial acts are, of course, of the widest variety and complexity, corresponding to the whole range of human motivation and varying in causes, nature, and consequences, according to the individual delinquent and the circumstances. In view of this fact it is seen to be futile indeed to search for any simple underlying cause or set of causes for delinquency in general. It seems more reasonable, confronted with the facts of repeated misconduct in a given individual, simply to regard that trend as something which has been learned by the person in question, and then to seek patiently for an explanation of its genesis as one would for the genesis of any other learned activity. This is, of course, exactly what Healy has done with so much success in the cases he has studied. He has regarded his delinquents, not as creatures belonging in a class apart, but simply as ordinary human beings with special problems and experiences of their own. The general trend of such work, now carried on more and more in the same unprejudiced spirit by others, is to show that juvenile delinquents are essentially normal children.

THE CONTROL OF ANTISOCIAL CONDUCT

THOMAS AND THOMAS have ably described and criticized methods employed in dealing with delinquents;¹⁷ and Healy and Bronner have made an extended study in which they have attempted to correlate outcomes (success or failure in

¹⁷ THOMAS AND THOMAS, *The Child in America*, chap. ii, "The Treatment of Delinquency," pp. 95-143.

after life) with methods of treatment.¹⁸ These authorities have shown how difficult it is to evaluate the various methods objectively, considering the intricacy of the problem and the difficulty of isolating the conditions or methods the effects of which it is desired to study. Without going into the matter of evaluating specific practical methods of treatment, we shall simply discuss from the psychological point of view the chief lines of attack on the problem of controlling delinquency; and since delinquency is merely more than usually serious unethical conduct or antisocial behavior, all that we say will be pertinent to the control of milder forms of undesirable conduct. We shall discuss, then, as general means of control, punishment, reëducation, and prevention; and then as the most important means of prevention we shall deal with the essential features of an adequate ethical training.

Punishment. — Psychologists are opposed to any theory of punishment which assumes that as a matter of justice there should be inflicted on an offender pain or suffering in proportion to the seriousness of his offence. The main reason for their objection is that the theory, in implying freedom of choice and complete responsibility of the individual for all his acts, is inconsistent with scientific determinism, according to which every delinquent act is the inevitable result of antecedent conditions. These include, to be sure, the ideas and intentions of the offender, but it is assumed that they too are determined by antecedent circumstances.

Instead, therefore, of the aim of meting out a just punishment, an idea really going back to the primitive rule of an eye for an eye and a tooth for a tooth, the psychologist would urge that a different purpose should govern the treatment of offenders; namely, the aim of so dealing with the

¹⁸ HEALY and BRONNER, *Delinquents and Criminals*, referred to above.

total situation as to protect society and prevent the recurrence of the offence. This would involve a thorough objective study of the relevant circumstances of the case, past and present, including the personality and capacities of the offender, to the end that the most socially effective treatment might be determined.

The psychologist's objection to punishment is not, therefore, to any special methods of treatment as such, but to the administration of punishment, either corporal or mental, in the wrong spirit and with a mistaken aim. If punishment is thought of simply as treatment, and administered as deterrent or curative, rather than retaliatory, psychologists have no objection to it. They would insist, however, that not the nature of the offence, but the conditions which led to its commission, should determine whether punishment is to be administered, and what form it shall take. Moreover they would urge that it should be administered with due regard to important psychological principles.

The considerations which should govern the administration of punishment, whether it take the form of inflicting bodily pain, of confinement, of temporary isolation, of deprivation of pleasures, or still other forms, may be summarized in five recommendations.

1. Punishment should not be given in a spirit of anger or vindictiveness. Such an attitude is not only irrational, but is likely to have bad effects. Punishment so given is likely to arouse persisting antagonism toward the authority who punishes. Young children sometimes accept punishment from the physically stronger parent with a show of submission or of repentance, but with a deliberate intention of getting back at him later, although probably in family life the retaliatory motive more often operates unconsciously. In the case of delinquents who are punished in this spirit by

authorities representing the state, antagonism may be felt not merely toward the individual authorities, but toward society or government in general. Thus punishment under certain circumstances may foster not only naughtiness in children but, in older persons, delinquency and crime.

2. Whenever possible, punishment should be given at the time of the act. If a small child who breaks a glass vase is scolded or rapped on the wrist at the time, the withdrawing responses are likely to become attached to the sight of the vase or to the general situation. But if the "punishment" comes an hour later, the withdrawing may just as likely become attached to the punisher as substitute stimulus. This point is related to Pavlov's finding that if conditioning is to occur, the two stimuli must overlap in time. As applied to older children, of course, the same rule will not be so important, since through verbal recall the original situation may be effectively reinstated.

3. When the person punished is able to appreciate the relation between his act and the treatment that follows it, this relationship should be made clear to him. He should understand why the punishment is given, and the reason for the form employed. One reason for this is that it will tend to prevent or at least minimize antagonism toward the punisher. A more important reason for the procedure is that it is necessary in order to develop a sense of responsibility in the individual. By this we mean that the individual will be able rationally to control his behavior and refrain from undesirable acts, only when he has a knowledge of the consequences of such acts, and a belief that these consequences are likely to follow. (Cf. page 457.) Since this rational understanding cannot be achieved until a certain stage of mental development has been reached, it is useless to try to explain reasons for punishment to an idiot or a very young

child. But it is better to run the risk of beginning reasonable discussion too early, than to run the risk of making the child overdependent on external control.

4. One of the most important generalizations we can make on this subject is that punishment should be consistent. If the case is a clear one, the form of punishment which is customary, or which the child has been told will follow, should follow automatically, "like natural law," with no delay, no consideration of excuses, no exceptions. This is essential to the inculcation of respect for authority in the child as well as to the development of self-control. If orderliness does not prevail, if the child sees that some are punished and others not, if he himself is sometimes punished hard and at other times let off, the effect on his social attitudes is bound to be bad. In the case of delinquents and criminals the same sort of demoralization is favored by inconsistent treatment, by the long delays in the courts, and by the belief that rich and prominent men have a better chance than others of escaping punishment.

5. Corporal punishment should be employed very sparingly, and in any case should never be more severe than is absolutely necessary to condition the individual against further wrongdoing. The great objection to bodily punishment is that it tends very strongly to arouse feelings of anger, and also a sense of shame or humiliation or a desire for revenge. In general, we might urge that it be employed only when the individual is too young or too mentally weak to see the connection between his act and some milder form of punishment; or else in some emergency when there is no time for other treatment and immediate conditioning is necessary.

In the case of very young children a mild form of "corporal" punishment may be in some cases necessary to condition the

child against harmful or very undesirable actions. The child may be conditioned against a hot radiator by allowing him to reach out just far enough to cause withdrawal on account of the natural heat stimulus, but in the case of other objects, for example, poisonous snakes against which, in some localities, children must early be conditioned, we cannot make use of such a "natural" stimulus. In such a case the child may be quickly rapped on the hand at the time, consistently, until the negative response is fixated, which will usually be soon. There should be only enough force to cause withdrawal, and there need never be an extreme emotional outburst on the part of the child. After the first few such conditionings, accompanied by "No, no," said in a firm way, the words, "No, no" should serve in other situations as an effective substitute for taps or blows. Thus mild physical punishment, accompanied by words, paves the way for verbal and later for rational control.

Reëducation. — From the point of view of the welfare of the individual as well as that of society, reëducation wherever it is possible is of course desirable, to the end that the individual may again take his place in society with new habits and more desirable social attitudes. Reëducation seems to be difficult in the typical institution for the care of delinquents, although it sometimes starts or is accomplished in such places. Court supervision, the friendly interest of social agencies, even the efforts of parents newly awakened to the seriousness of their responsibilities but themselves badly in need of reëducation, all these means we might expect to be relatively ineffective in supplanting deeply rooted practices. Hence it is not surprising that in spite of continued efforts to alter conditions for the better for six hundred and seventy-five Chicago cases studied by Healy, fifty-five per cent of these failed to change their habits fun-

damentally.¹⁹ Then, too, we must remember that in certain cases of incurable mental defect or disease, advanced paresis being an outstanding example, attempt at reform through reëducation would be futile.

In spite of the difficulty of reëducation, and in some very few cases its impossibility, there seems to be no question but that, under favorable conditions, it *could* be accomplished for the vast majority of juvenile delinquents. Especially favorable conditions may be found in foster homes, where the child may often, as Healy says, for the first time gain familiarity with family life in which good will, fair play, and affection exist; where the chief motivating situations which gave rise to the original delinquency are lacking; and where wise adults constantly seek to provide new motives for forming better habits.

A very significant experiment in the reëducation of delinquent and problem children has been carried out by Healy and his associates of the Judge Baker Foundation. It is reported in detail in the stimulating book *Reconstructing Behavior in Youth*, which presents data on the five hundred and one cases of delinquent and problem children who were studied during eight years by the Judge Baker Foundation and who received treatment by placement in foster homes. In this group seventy-five per cent were recidivists, or children who had repeated their offences after attempt by some authority to check their misconduct; and sixty-five per cent had been in some juvenile court. Eighty per cent were technically delinquent. Many who had never been in court were actually guilty of as serious offences as others who had been in court. In general, then, the five hundred and one cases were especially difficult individuals.²⁰

¹⁹ HEALY and BRONNER, *Delinquents and Criminals*, p. 28.

²⁰ HEALY, WM., BRONNER, A. E., BAYLOR, E. M. H., and MURPHY, J. P., *Reconstructing Behavior in Youth, a Study of Problem Children in Foster Families* (Knopf, 1929).

The authors state in presenting their results that placing was considered successful if the individual had immediately or gradually ceased his delinquency, and if unfortunate personality characteristics or habits had improved to the extent that he became and remained an acceptable member of an ordinary family group. They do not say, as one might desire, how long this situation must continue to be called a success.

The following table presents the numerical results for a special group of three hundred and thirty-nine cases placed by private agencies, which were more successful in placing than either courts or state agencies.

TABLE SHOWING OUTCOME OF PLACING IN RELATION TO
MENTALITY CLASSIFICATION

(From Healy, Bronner, Baylor, and Murphy, *Reconstructing Behavior in Youth*, p. 245 (Knopf, 1929). Reprinted, with modifications, by permission.)

	Normal Mentality				Defective				Abnormal and Peculiar			
	Success		Failure		Success		Failure		Success		Failure	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Delinquents												
Repeaters . . .	94	81	21	19	4	....	2	....	25	36	45	64
Non-repeaters.	37	92	3	8	4	....	1	....	9	....	7	....
	131	85	24	15	8	....	3	....	34	40	52	60
Personality and Habit Prob- lems	59	95	3	5	6	....	3	....	12	75	4	25
	190	90	27	10	14	70	6	30	46	45	56	55

It is a striking fact that ninety per cent of the mentally normal succeeded. The authors state, moreover, that some of the failures were due to outside factors such as lack of coöperation between the family and the agency, and were not the result of "unmodifiability" of the child. It is not surprising that a little over one-half of the abnormal or peculiar failed. The wonder is rather that so many succeeded. The actually delinquent succeeded nearly as well (eighty-five per cent) as the children who were merely personality and habit cases (ninety-five per cent).

The data show, interestingly enough, that while children taken at earlier ages are somewhat more likely to succeed, the difference in per cent of successes between the group aged thirteen to eighteen years and those of younger ages is slight. This suggests that in the treatment of delinquent trends the factor of repetition is far less important than the factor of motivation. It is not necessarily true that a habit which has been a long time building will take a correspondingly long time to get rid of. If the habitual delinquent act occurs as a response to a particular recurrent motivating situation, it may simply drop out of the total behavior pattern when the situation no longer exists. With a return to the old environment, however, as common experience in handling delinquents testifies, the older behavior is likely to recur.

The study of the "heredity" (family history) of these cases also resulted in interesting findings. "For example, in agency-placed cases, success occurs as follows: eighty-two per cent for those without known defect among the forbears, eighty-one per cent for those who had parents one or both diagnosed as mentally diseased or defective, and seventy per cent for those whose parents, one or both, were criminalistic. The same proportions hold for the total group. What is

ordinarily called poor heredity plays little part, then, compared to other factors in the situation. Child placing agencies have little reason, apparently, to reject children merely upon the basis of poor heredity." ²¹ How much germ plasm heredity (as distinguished from congenital influences or social heredity) has to do with the poorer showing made by the group with criminalistic parents, it is left to the student to decide.

The remarkable work done by the Judge Baker Foundation shows that under especially favorable conditions reëducation may be exceedingly effective, and it should encourage the faint of heart to renewed effort even under conditions less favorable. If so much can be done for positively delinquent children, we might expect that even more could be done for non-delinquent children. In the case of both delinquents and non-delinquents, however, reëducation is bound to be difficult, time-consuming, expensive of energy as well as of money, and often not entirely successful. It is not reëducation of delinquents which is most important, but education of ordinary children who are all potential delinquents.

The Need for Concentration of Efforts on Prevention. — Since delinquency usually represents one way of obtaining satisfaction of a motive not adequately satisfied in other ways, an important general means of prevention is to attack the problem of so regulating social, economic, and political conditions that the major human needs may be given adequate satisfaction. The problems involved are not specifically psychological, and beyond pointing out certain main directions which this regulation might well take we shall not go into them here.

²¹ HEALY, BRONNER, BAYLOR, and MURPHY, *op. cit.*, p. 250, and Table 22, pp. 311-312.

Because many of the major difficulties of delinquents have been found to arise in the course of adjustment to school and conditions of work, we should emphasize the need for the study of the particular capacities and needs of the individual child both in the home and in the school, with regard to the later selection of a life work. Vocational guidance should thus be important in the prevention of antisocial conduct. Slawson showed that his delinquents were on a par with unselected children so far as mechanical ability is concerned, although inferior in tests of abstract intelligence, a fact which suggests the need for more manual and mechanical training in the schools. As he points out, the fact that there is among his delinquents decided inferiority in abstract intelligence is significant from the point of view of treatment, even though on account of the racial and social status constitution of the group it does not throw direct light on causation. If these particular boys, at a disadvantage in the formal school subjects but with good mechanical ability, had been given more concrete school training suitable to their needs, many of them might not have become delinquent.²²

Other practical measures would include attack on the problems of health — malnutrition, alcoholism, and the like — which may possibly be important factors in the development of emotional instability. Considering the prevalence of broken homes among delinquents, the study of problems of family life in relation to marriage, divorce, and employment is seen to be particularly indicated. As a part of the general attack on bad environmental conditions, attention to the need for adequate recreation is demanded. Since play in the broad sense of the word is perhaps the most effective

²² SLAWSON, JOHN, *The Delinquent Boy*, pp. 151-169, and chap. iii, "Mechanical Aptitude and Male Juvenile Delinquency."

means which human beings have of getting genuine satisfaction for needs which cannot be directly met the importance of this means of dealing with antisocial conduct can hardly be overestimated. In spite of the best we can do, however, problems and conflicts will develop. In view of the apparent disproportional prevalence of emotional symptoms among misconduct cases, the attempt to deal with emotional maladjustments in their incipiency is clearly important. Other general means of attacking this problem include the establishment of nursery schools, public as well as private, and the rapidly growing movement for parental education.

But we have not mentioned what is probably the most fundamental means of prevention. Whatever the social and economic conditions, however effective the school education, however well trained a young person is for carrying on a life work, disaster may come if ethical training is unwise. So important a means of prevention is ethical training that we shall devote a separate section to a brief analysis of the psychological factors involved.

THE ETHICAL TRAINING OF CHILDREN

No Innate Moral Sense. — The child does not come trailing clouds of glory, with ideas of truth and beauty gained in his happy play by the shores of that immortal sea which brought him hither, although that poetic statement of a not uncommon belief makes a strong appeal to anyone who has watched a wide-eyed "thoughtful" baby grow up through the delightful first months into the inevitably more or less naughty years of early childhood. Neither does he come into the world burdened by original sin. It has become a truism to say that the child is neither good nor bad, neither moral nor immoral. He is simply non-moral.

Nature and Aims of Ethical Training. — With the decline of authoritarian morality, the conception of the scope of ethics has broadened, until it has been conceived (by Everett) to be the science of values in relation to the conduct of life as a whole.²³ According to this point of view psychologists are contributing to the establishment of ethical values when they point out the effects of such things as the use of alcohol, emotional fixation on parents or members of the same sex, indulgence in dancing, and the like, even though in so doing they have avoided the use of the terms right and wrong. If ethical acts are those which have to do with the conduct of life as a whole, any act whatever may be ethical. In common practice, however, we restrict the term to acts which have consequences either noticeably advantageous or disadvantageous to the individual, or, especially, to his fellows. That is, they are acts which are judged to be either good or bad. Much activity seems neutral in this respect.

Certain general aims for the conduct of life as a whole may be at present taken for granted. In the first place, it would usually be agreed that it is desirable for an individual to try to adjust himself to conditions as he finds them in this world; that is, that he find some present means of satisfying his leading motives. The ideal of denying human wants and ignoring the world we know in favor of a future one is no longer dominant. In the second place, a regard for the welfare of all other human beings has come to be considered a fundamental ideal, partly at least because human beings best realize their capacities and satisfy their needs when living and working together. A third ideal for the eligible life is that it should be rationally organized; that is,

²³ EVERETT, WALTER G., *Moral Values—a Study of the Principles of Conduct*, p. 7 (Holt, 1918).

so integrated that there is harmony in the satisfaction of the various motives, and no one aspect of life is sacrificed to other important aspects. In other words, to use again the phraseology of Everett, the goal of human effort is the enlargement of personality, the harmonious realization by an individual of all his powers.

Assuming for the sake of argument that the above are not only recognized but legitimate general aims of ethical training, the psychologist may inquire in what ways they are being realized; how effectively certain related habits, attitudes, and concepts are being developed in children; and to what extent various methods of education now in use contribute to the development of these habits, attitudes, and concepts. Realizing the importance for psychology of research in character study and character education, a number of psychologists have in the past few years devoted a good deal of time to the study of special problems in the field. Pioneer work was done in the period of the Child Study Movement by Hall, Earl Barnes, and others.²⁴ More recently the period of statistical analysis by means of objective testing devices, inaugurated by Voelker, Cady, and Raubenheimer,²⁵ has been brilliantly carried forward by such psychologists as Goodwin Watson, Hugh Hartshorne, and Mark A. May.²⁶

²⁴ HALL, G. S., "Children's Lies," *Ped. Sem.*, 1:211-218 (1891); BARNES, EARL, "Punishment as Seen by Children," *Ped. Sem.*, 3:235-245 (1895).

²⁵ VOELKER, PAUL F., "The Function of Ideals and Attitudes in Social Education: an Experimental Study" (*Teachers College Contr. to Educ.*, No. 112, 1920); CADY, VERNON M., "The Estimation of Juvenile Incurrigibility" (*Calif. Bureau of Juvenile Research*, 1923); RAUBENHEIMER, ALBERT S., "An Experimental Study of Some Behavior Traits of the Potentially Delinquent Boy," *op. cit.*

²⁶ WATSON, GOODWIN B., *Experimentation and Measurement in Religious Education* (Association Press, 1927). This book besides contributing important original material gives an excellent idea of the character and extent of all other work in the field to the date of publication. HARTSHORNE and MAY have recently published, besides the volume *Studies in Deceit* already referred to in this chap-

So far, the main result of these important studies has been the working out of objective and statistical methods. The study is, however, yet in its infancy, and immensely promising as it is, there is as yet no very large body of psychological knowledge in the field. Partly for that reason we shall not here attempt to analyze the results which have already been obtained, but shall merely deal briefly with the general features of ethical development in children.

The Development of Ethical Conduct.—The foundations of morality are present in the behavior of the infant, but it is very gradually that he learns to act in ways which we may call ethical, and it is years before he himself learns to judge his conduct as good or bad. Ethical conduct precedes ethical knowledge, and it is upon knowledge that self-control in the light of ethical standards is based.

1. Ethical habits are acquired in specific situations. The theory is implicit in popular thought that ethical conduct in an individual is dependent upon the possession of certain virtues because of which he reacts in certain ways in certain situations—the virtue is an underlying something which expresses itself in particular acts. But as Hartshorne and May point out, a man's honesty is neither a secret reservoir of honest virtue nor merely a general ideal which he holds, but it resides in the quality of the particular acts he performs. According to this "doctrine of specificity," "a trait such as honesty or dishonesty is an achievement like ability in arithmetic, depending of course on native capacities of various kinds, but *consisting in* the achieved skills and attitudes."²⁷

Hartshorne and May base this doctrine upon their factual

ter, a second volume called *Studies in Service and Self-Control*. A third volume, analyzing the nature of character as a whole, is now (spring of 1930), being published by Macmillan.

²⁷ HARTSHORNE and MAY, *Studies in Deceit*, Bk. I, p. 379.

studies of deceit. They gave to school children, we recall, many different objective tests measuring, with a high degree of reliability, cheating, lying, and stealing in classroom and other situations. If a child is deceptive in one situation we might expect him to be in another. If he cheats we might expect him also to lie. While there would be exceptions, we might expect a very high correlation between the deception scores of a large group of children on one test and deception scores of the same children on another test.

As a matter of fact, Hartshorne and May found a high mathematical correlation between deception scores on tests of the same type, such as between cheating on arithmetic tests and cheating on a vocabulary test (the average inter-correlation of three school tests was $+.696$). But between deception scores on tests of different types correlations were much lower. For example, the correlation between cheating in school and cheating in athletic contests was only $+.198$; and the correlation between tests of stealing and tests of lying was only $+.132$. There was even much variation within a given type of test according to the nature of the material. The authors say that such slight changes in a test situation as from crossing out A's to putting dots in squares are enough to alter the amount of deception both in individuals and in groups. This variability of deceptiveness according to the situation is evidence that deceptiveness is not a particular trait or tendency either possessed or not possessed by an individual child. It consists rather in a loosely organized system of habits or attitudes which have been learned in special situations, and which are then ready to function in similar situations.

These results are strikingly in line with experiments on "transfer of training," in which it is shown that, other things being equal, a habit learned in one situation may be expected

to function in another situation only to the extent that the second situation has features ("identical elements" to use Thorndike's term) like those of the original. A class taught to multiply three place numbers but not to divide, will not learn the second operation without specific training; children who have learned to cheat in school will not take money from home unless the situation at home is in some way conducive to the development of such conduct; a boy who is an habitual truant may also indulge in petty stealing and, it seems, frequently does so, not, however, because of a general tendency to delinquency, but because while he is absent from school specific situations arise which favor stealing.

Desirable social habits and attitudes are of course learned in the same way that undesirable ones are, and are no more dependent than they are on a mere general tendency or trait. The fact that a young girl would never dream of reprimanding a guest in the house for accidentally breaking a dish, is no guaranty that she will show similar thoughtfulness to servants, any more than the fact that the average citizen conscientiously pays his grocery bill is a guaranty that he will state his income correctly to the tax assessor.

2. Ethical standards are based on the spontaneous native and acquired reactive tendencies of the organism. It is in connection with native and acquired reactions which are already functioning in specific situations that those verbal formulations develop which we call ethical standards. In general, situations which the child natively avoids and the reaction to which is unpleasant are actually undesirable from the point of view of effective adaptation; things which elicit positive and consequently pleasantly toned behavior are desirable, objectively speaking. Now the adults among whom the child grows up apply the word

bad (or similar words according to the circumstances) to the first type of situations, the word good to the second. And even after the native responses have been somewhat modified through teaching or through the results of individual experience, this general correlation will hold.

Thus the child's first ethical judgments, Carr points out, are likely to be based on the immediate character of the objects and the responses they elicit. Whatever the child tends naturally to react positively to, natively or as a result of early teaching, he will regard as good; whatever he tends to avoid will seem bad.²⁸ The child's first judgments of his own activities will therefore be based largely on their immediate personal consequences, and his judgments of the activities of other people will be based on their effect upon him. If the act of another hurts him, elicits negative and unpleasantly toned behavior on his part, he will call it bad; if its consequences are pleasing to him personally, he will call it good.

3. Childish ethical standards become progressively socialized. Gradually the child learns to base his judgments upon the social consequences of his acts, as well as their consequences to him personally. He also learns to apply the terms good or bad in accordance with future consequences, which he foresees, as well as immediate consequences. As this development takes place, the judgments good and bad are less closely associated with pleasant and unpleasant behavior. Some acts which are immediately pleasant come to be judged bad or wrong, because of their social consequences; and some which are unpleasant are seen to be good.

Some of the factors in the transition from an individual-

²⁸ CARR, H. A., *Psychology*, chap. xiii, "The Affective and Evaluating Aspects of Experience." The student is advised to consult this chapter as an outstanding objective treatment of values.

istic to a more impersonal ethical standard are thus summarized by Carr:

"Necessarily many acts must be experienced and evaluated from both points of view [of the individual and of society]. The same individual may both cheat and be cheated, and the young bully may in turn be bullied by a larger companion. Sympathy and love for others, and the desire to placate and win the approval of our fellows also constrain us to envisage our acts from their point of view. For numerous reasons we all become members of various social groups, and naturally come to identify to some extent the welfare of those groups with that of our own. In other words, we develop a social personality, and as a consequence begin to evaluate all acts more and more from the standpoint of our wider social self-interest—from the standpoint of the groups to which we belong. In the process of mental and social development, each individual enters into and identifies himself with larger and more inclusive social groups such as the home, the church, the school, a professional or economic group, the community, the state, the nation, and his racial group. Beginning with an egocentric attitude, each developing individual is forced to keep continually revising his ethical values from the standpoint of a more inclusive group, until the ideal is finally attained of judging all things from the standpoint of the welfare of humanity as a whole. . . Each individual's ethical conceptions are gradually acquired through life, while the ethical standards of any race are the products of its racial development."²⁹

Social influence on ethical development is exerted through direct teaching. The child is interrupted, restrained, or subjected to physical punishment whenever he does or says something that runs counter to the standards of the adults

²⁹ CARR, *op. cit.*, pp. 304-305.

surrounding him. At the same time he is told "No, no !," "Shame !," and the like, and hears such words as bad, selfish, mean, or wicked used in certain types of situations. Thus he is taught to talk and to think in the approved ways in these situations. Especially approved activities are not only allowed to continue, but are rewarded or praised. These the child learns later to call, according to the situation, good, kind, unselfish, honest, and the like.

The child probably learns more, however, through example than through precept. In his daily life at home, at school and church and theater, he observes the behavior of adults, and finds in it the patterns for most of his own activity. The ethical judgments expressed incidentally by adults in conversation with each other, with no thought of his instruction, are of course taken seriously by him. Moreover many indirect expressions of approval or disapproval give rise, through association with more elementary situations in which there is direct sensory reward or punishment, to ethically important attitudes and concepts. Thus a little girl who could not read heard her older brother and sister express disgust, on various occasions, at finding a story "continued." Hence she supposed that all continued stories were very bad, and for a long time was consumed by curiosity as to their nature.

4. Knowledge of consequences makes ethical control possible. If a child has learned the appropriate verbal symbols along with specific ways of responding in certain situations, then, when the situations later recur, the verbal symbols are likely to be reinstated first; and according to the circumstances they either check or favor certain lines of activity. Thus when the child encounters a situation tending to elicit a response which has had disrupting or inhibiting consequences, personal or social, and which he has

learned to call bad (or some other such term), the previous verbal judgment may be reinstated and the child may refrain from the act, not necessarily because he has been strongly enough conditioned on a sensory-motor level, but increasingly, as he grows older, because the consequences of the act are *symbolically reinstated* before performance; and the judgment "bad," applied accordingly, leads to the substitution of some other act than the one to which the situation, in the absence of previous experience, would have led. In a precisely similar way the child may learn to foresee the beneficial consequences of his acts, to judge them good and to react accordingly. Thus, as Carr says, the possibilities for ethical conduct are directly related to the knowledge which an individual has of the probable consequences of his acts.

Implications of These Principles of Development for the Control of Conduct. — The preceding brief account of the way in which ethical conduct develops has important practical implications.

1. In the case of young children, or older persons who have not achieved a rational organization of their ethical standards and conduct, verbal teaching is useless unless based upon reactions in specific situations. If they are not so based, standards of conduct may simply be new habits of a verbal character, functioning more or less independently of actual everyday behavior.

The fact that in school children knowledge is not virtue is shown by experimental work. Hartshorne and May found that of nine hundred and thirty-three pupils who copied from keys in school tests, eighty-nine per cent stated their belief that to copy from the keys was cheating.³⁰ Slawson, when giving the Mathews psychoneurotic inventory, found that the question "Did you ever feel that you were very

³⁰ HARTSHORNE and MAY, *Studies in Deceit*, Bk. I, pp. 139-140.

wicked?" was answered affirmatively by forty-three per cent of his delinquent boys as compared with twenty per cent of unselected boys, although "wickedness" is a strong word, and many of them, we might suppose, would be unwilling to admit wickedness though conscious of it.³¹ Weber reports that one hundred and thirty-eight girls in a reformatory, given the task of ranking sixteen bad practices in order of badness, showed as much moral insight as a control group of university women.³²

Probably the most telling quantitative evidence we have at present as to the ineffectiveness of mere verbal teaching, is that supplied by Hartshorne and May in their study of the relative amount of deception among groups of pupils otherwise comparable, who did or did not attend Sunday school, or who were or were not members of organizations which have as their chief aim the teaching of character. Dealing with large numbers of children, they found that so far as their tests went, neither the length of time the children had attended Sunday school nor the regularity of their attendance seems to be at all associated with their tendency to deceive either at school or on work taken home. They found, moreover, that, judging by results in the tests, the effects of a well-known organization, "X," were either neutral or even positively deleterious with regard to one of its major aims, the teaching of honesty.³³

2. Consistently ethical behavior may be achieved. The doctrine of specificity would seem discouraging, since it is manifestly impossible for any child to learn all of the literally countless socially desirable ways of reacting in par-

³¹ SLAWSON, *The Delinquent Boy*, Table 44, p. 251, question 69.

³² WEBER, C. O., "Moral Judgment in Female Delinquents," *Jour. Appl. Psychol.*, 10: 89-91 (1926).

³³ HARTSHORNE and MAY, *op. cit.*, Bk. I, chap. xviii, "Sample Studies of the Effects of Moral and Religious Education," pp. 339-367.

ticular situations. But while there is neither a general fund of virtue upon which to draw, nor automatic spread of a desirable habit to unlike situations, transfer does occur, and an understanding of the ways in which it may occur will facilitate control. In the first place we must remember that transfer occurs readily when the new situation has objective or sensory features in common with the old. To illustrate, a child who has really learned not to pull the tail of his own gray kitten will not be likely to pull the tail of the black cat next door, or of any cat—and will probably refrain also from pulling the tails of dogs or other furry or woolly quadrupeds.

The difficulty in transfer comes when we have two situations the external features of which are quite different, but in which the essential social situation is the same. A child may utterly fail to see in two different situations the common features which are apparent to an adult. And a person who has not acquired the habit of reacting critically and analytically may fail to see in his different daily activities the common features which are apparent to a more thoughtful observer. But if in the course of daily experience the varying situations are analyzed for the child or by him, he may learn the common features and may express them in a general statement, so that when he encounters a new situation he will have insight into it, that is, he will react to the significant features on the basis of his past experience. Through rational analysis and generalization, therefore, what is learned in specific situations is made "transferable" to other situations, and it is not necessary for the individual to learn a new mode of response for every concrete situation encountered.³⁴

Thus we see that both specificity and generalization are

³⁴ Compare with HARTSHORNE and MAY, *op. cit.*, Bk. I, pp. 379-380.

important in ethical growth. Not only should the special situations which children encounter be favorable to the formation of socially desirable habits; but the children should be encouraged to understand the situation and the reasons for the approved conduct, to the end that their behavior in similar situations may be increasingly consistent and rationally adaptive.

Since the habits of rational analysis and organization develop slowly in childhood, and are employed only irregularly and with varying thoroughness by adults, we shall not look for a high degree of consistency in the ethical conduct of the child, nor be surprised if adults often behave in ways contrary to their ideals. This inconsistency we shall regard as the natural result of the manner in which ethical conduct develops, and not necessarily as evidence of lack of sincerity or "goodness."

Let us take as an illustration of transfer through generalization the case of a child who has learned to give a pleasant greeting to any one of his classmates whom he may meet on the street (granting for the sake of argument that this is an ethical or socially desirable type of response). His parents having moved to a poorer section of the city, this child now meets outside the school some classmates who are dirty and poorly dressed, others who have brown skins and peculiar features. To such features he has learned to react negatively. Will he greet the strange children pleasantly, or proceed either to ignore or to mistreat them? That depends on the child's previous training or the instruction he will now receive. Certainly the mere fact that he has greeted his social equals pleasantly will not automatically cause him to respond thus in the new situation. But if the new situation is analyzed for him (or by him) so that he sees that these children are in most ways like those he has

known, that they are as likely to be hurt by unfriendly treatment, and that they themselves are not responsible for their complexion or even for their rough appearance, undesirable as the latter is, then when he sees the new children primarily as human beings rather than as badly dressed children his manner of greeting is very likely to change, although in certain other ways he may behave differently to these children from the way he behaves to the others. It is only when the similar elements in a new situation are labelled for the child that the appropriate response is likely to be called out.

It is clear that in advance of the actual new experience supposed above, parental or other teaching might have paved the way for the desired response, through verbal analysis. The appearance, actions, and characteristics of other nationalities and social classes might be frankly discussed, with the aim of getting the child to see what are the factors considered essential by his parents, and to have a desire himself to learn more about other people. But however concrete this teaching is made through such devices as pictures and stories, some actual overt experience is presupposed. In this hypothetical case, supposing pleasant greetings to be generally desirable, the child might get practice in contacts with servants, with the foreign fruit peddlers, immigrant neighbors, and the like. Whatever the nature of the practice, however, effective generalization, which means transfer or application to new situations, is made possible only by rational analysis.

We have already suggested that the rational analysis need not necessarily be made by parents or teachers. The child who has been trained to see problems and to face new situations squarely, will, after he has reached a certain degree of intellectual maturity, himself be able to analyze and more

or less adequately to label modes of behavior different from those with which he has been familiar. Since conditions constantly change and each new generation faces new problems as well as old, specific ethical standards will be modified to fit the new situations. Whether the modification be attempted hastily and rebelliously, or in the spirit of reason, depends in part, certainly, upon the sort of training for thinking which the individual has had.

3. Truly ethical behavior is integrated behavior. In the last analysis it becomes clear that ethical training is simply training in general—that almost anything which a child learns may, under certain conditions, have implications for the conduct of his life as a whole, and thus be, in Everett's sense of the word, ethical. A person whose conduct is truly ethical is not merely one who does a great many particular things which other people would agree in calling good, but a person whose whole personality is so organized with respect to certain leading ideals, that any one important phase of his activity is significantly related to the rest.

Delinquent and antisocial conduct in general is thus, from one point of view, unintegrated conduct—it is activity which satisfies a particular motive for a time, but which in the long run is not consistent with the best interest of either the individual or of society, granting the validity of the general aims with which this discussion started. Antisocial and unethical conduct of all sorts, therefore, ordinary or delinquent, takes its place along with such indirect modes of response as hysteria, excessive daydreaming, the use of drugs, and insanity, as natural but non-integrative modes of meeting problems.

CHAPTER XIV

THE GROWTH OF PERSONALITY

WHILE there are undoubtedly present at birth factors which favor the development of certain traits rather than others, we expect personality to take shape and form in the course of the child's daily experience in his particular world. It is customary to deny personality to the infant, but to say that it is present at three years, or five, or fifty. The word implies more consistency and more organization than is present in an infant, and it refers to something more than the traits which comprise it. Each personality is a unique pattern or organization of traits.

In this chapter we shall make a somewhat detailed analysis of personality traits in general and the conditions of their development, with regard to the ways in which they are related as functional units of the total personality. In so doing we shall make no attempt to deal with them in separate classifications, as, for example, ethical traits, emotional or temperamental traits, and "intellectual" traits. Traits are so complex and so intricately interrelated that it is difficult to fit them into any arbitrary classification; and besides a separate treatment of classes of traits might tend to obscure the view of personality as a functioning whole which we wish to develop.

THE NATURE OF PERSONALITY TRAITS

IN ORDER to make more concrete and more serviceable the conception of a trait which we presented briefly in the last chapter, we shall cite an experimental study by Floyd and Gordon W. Allport of the traits of ascendance and submission.¹ College students were asked to indicate on printed blanks their usual adjustments, or those which they believed they would make, to a large variety of concrete situations which would ordinarily reveal either dominant or submissive tendencies. The aim was to present a fair sampling of situations of this sort which students might be expected to encounter in their daily lives, situations involving, for example, behavior in social groups with prominent people present, and attitudes towards salesmen and towards business or academic superiors. For example, one question is, "Are you embarrassed if you have greeted a stranger whom you have mistaken for an acquaintance?" and the student is to check one of the three replies "very much," "somewhat," or "not at all." Another question is, "At a reception or tea do you seek to meet the important person present?" and the student is to check "frequently," "occasionally," or "never." The replies to each situation of the test were scored as plus (ascendant) or minus (submissive), on the basis of independent ratings of the subjects. The total score on the test was the algebraic sum of the ascendant and submissive scores for the separate items. Thus a student who had a total ascendant score of +60 and a total submissive score of -20 would have a total score on the test of +40. This means that although on some of the separate situations he indicated a submissive type of response as usual for him,

¹ ALLPORT, GORDON W., and FLOYD H., *A-S Reaction Study* (Houghton Mifflin, 1928). See also ALLPORT, GORDON W., "A Test for Ascendance-Submission," *Jour. Abn. and Soc. Psychol.*, 23: 118-136 (1928).

on the whole, if these situations are really typical of life situations commonly met, he tends to assume an ascendant rôle.

Figure 24, giving the distribution of the scores of four hundred college men, shows that a very few, according to

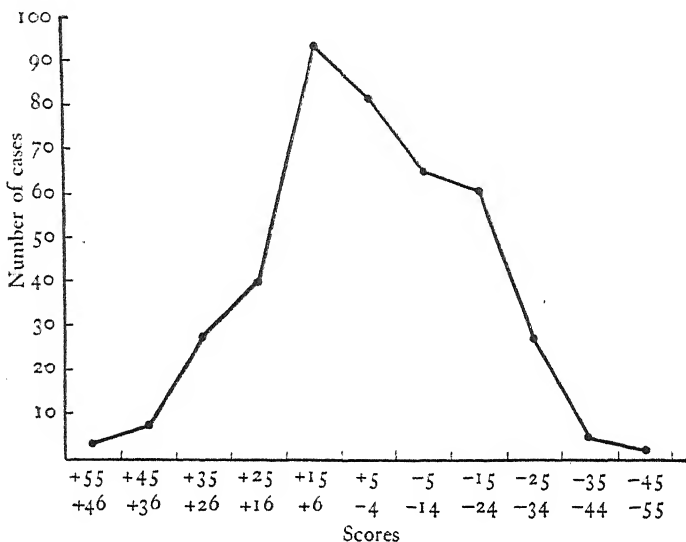


Fig. 24. DISTRIBUTION OF ASCENDANCE-SUBMISSION SCORES OF FOUR HUNDRED COLLEGE MEN

The intervals on the base line represent scores grouped into intervals of ten. For example, three men received scores between +46 and +55, indicating a high degree of ascendancy; and two received scores between -45 and -55, indicating a strong tendency toward submissiveness. (Reproduced by permission from "A Test for Ascendancy-Submission," by G. W. Allport, *Jour. of Abnormal and Soc. Psychol.*, Vol. XXIII, No. 2, July-Sept., 1928.)

the test, were markedly ascendant, making a plus score on most of the situations, while a very few were correspondingly submissive. The other subjects received intermediate scores scattered between these extremes, a large percentage showing only slightly more leaning toward one tendency

than the other, or else being pretty evenly balanced with respect to the two.

The test seems to be reliable. When a group of students was given two different editions at an interval of about six weeks, their scores the second time corresponded closely to those for the first edition (correlation $+ .78$); and the scores made on one-half the test situations correlate well with scores made on the remaining items ($+ .58$, or $+ .73$ corrected). Thus the test measures some more or less consistent factor in personality. That is, the responses to the various concrete situations presented evidently indicate that related habits and attitudes are involved. That the test measures what it aims to measure is suggested by correlations ranging from $+ .459$ to $+ .63$ between the test scores and ratings by associates and by the subjects themselves on these traits. Each student was rated by five friends on a seven-point scale ranging from one (most ascendant) to seven (most submissive), and the average of these ratings as well as self-ratings by the subjects were used as a criterion with which to compare scores on the tests. Uncertain as both ratings and test scores are, it is yet reasonable to accept them, provisionally of course, as valid measures of ascendance and submission. At least they measure some system of adjustments fairly consistently.

The results of this study are interestingly in line with those of Hartshorne and May's elaborate studies of deceitfulness. None of Allport's subjects was completely consistent in his replies. A few, to be sure, indicated ascendant responses to a very large majority of the situations; and a few made a correspondingly high percentage of submissive replies. But in most subjects there was considerable variation according to the situation, so that it may be said that each subject possessed both traits, though in differing de-

grees. Similarly in the studies of Hartshorne and May, there was considerable variation in amount of deceptiveness according to the situation. The reader will recall that correlations between deceptiveness scores of the same groups on different tests, while positive, were sometimes low, meaning that a child who cheats on one type of test will not necessarily cheat on other tests; and that no child is uniformly honest in all situations, although some children behave with much more consistency than others. In other words, each child has the traits both of honesty and of deceptiveness. Both of these studies, conducted with different aims and by different methods, show that traits are not independent underlying entities which are either possessed or not possessed by the individual child. They are, rather, more or less loosely organized systems of habits and attitudes which have been developed in the process of adjustment to the special and varying conditions of his life.

To say that traits are not independent entities is not, of course, to deny that they are real factors in the growth of personality. The fact that in the experiments on deceitfulness positive correlations, and sometimes very high correlations were found between performances of a group on different tests, testifies to the existence of *more or less* loosely organized systems — to the existence of tendencies to behave in describable ways which may in certain individuals be strong and very consistent. The results of Allport afford statistical evidence of similar tendencies. Thus experimental work does not question the usefulness of the common term trait or characteristic. It simply demonstrates the incorrectness of a common assumption as to the nature of traits which is implicit in popular thought.

We have dwelt on the specificity of traits because the widespread popular conception that they are underlying

entities of some sort is often a cause of unfortunate attitudes toward children. Parents are sometimes greatly shocked when their children behave in ways contrary to their expectations. If they realized to what an extent the child's behavior depends upon specific training, they would be both wiser and more tolerant in their methods. The sort of analysis that Hartshorne and May have made demonstrates particularly well the fallacy of supposing that personality traits are inherited as such. In many traits special hereditary factors are undoubtedly important, but all traits grow, and any developed trait has a complicated history. In the course of this history, as we have shown in discussing ethical traits, generalization is achieved as the child learns to apply the proper verbal labels to new situations; and as he is trained in the habit of rationally analyzing new situations, the trait functions in an increasingly consistent way. But the possession of a well developed trait is never a guaranty of complete consistency of conduct along a given line.

It follows from our treatment of motivation, in which we developed the point that any acquired habit may give rise to a motive, that traits, as systems of such "habits," may be expected to function as motives. Just as the absent-minded professor, accustomed to fingering a piece of chalk while he lectures, may be restless and ill at ease until he has a piece in his hand, so on the same principle will a person with strongly developed negative attitudes toward stealing tend to be ill at ease if he has yielded to the temptation to take some article, until he has returned it or in some other way "satisfied his conscience." In both cases some internal set of stimulating conditions has been aroused and it is this which is likely to determine the outcome of the situation. The internal stimulating situation (motive) will be strong or weak, and may or may not prevail, according to the

strength and consistency of the system of habits which have given rise to it. Thus some school children are honest in most situations, but fail when the specific situation is too compelling (for example when cheating is easy and not likely to be detected); while a few children have been so consistently trained, both in concrete responses and in the rational analysis of new situations, that they refrain from cheating in all but the most provocative circumstances. Hence a well developed trait is likely to be a strong motivating factor, and like any less complex motive, is more important than the outer situation in determining the responses in a problematic situation.

How Traits Develop. — The growth of traits proceeds on the basis of perceptual-motor and ideational learning; and their form and unity are determined by the persistence of inner motives which become more complex and generalized as the child grows older, and by the recurrence, on the side of the outer environment, of external motivating situations.

The infant's behavior is early modified in varied ways through conditioning; and conditioned responses developed in connection with feeding, sleeping, and the attentions of other people, are likely to be the nuclei of traits which in the course of later experience take on more definiteness. The impression that permanent personality traits are revealed in a baby's behavior at or shortly after birth is natural, since parents are anxious to see in the newborn child some promise of personality and especially some likeness to themselves. Thus particularly lusty crying is taken to indicate "independence" or "temper," and quiet reposeful behavior "a sweet disposition." But objective observation does not support such beliefs. In a study directed by Dr. Paul H. Furfey, seventy-five infants were rated by a nurse as to general be-

havior during the first few weeks, whether fretful, quiet, good-natured, irritable, and the like; and these estimates were compared with independently made judgments of the corresponding trends of the same children, when between eighteen and twenty-four months of age.² There was found to be no significant correspondence. Further statistical study is desirable. It is reasonable to suppose that in cases where special physical conditions such as a glandular excess or some special physical defect exist, related personality trends would persist. Ordinary personality differences in infants during the first weeks might be supposed, however, to be due to differences in general condition which are likely soon to change according to the circumstances of care and treatment.

Some traits which are closely related to conditioning in babyhood and the very first years are emotional dependence on parents (fixation) owing to an excess of petting and cuddling; dominance over others, connected with compliance with the child's wants without regard to the establishment of an optimum schedule; nervousness, conditioned by noises and rough, irregular, or inconsistent handling (sometimes loving, sometimes harsh) such as is likely to be given by nervous adults; and undue submissiveness connected with an over-meticulous insistence on routine and good manners. The various "pats" and "no, no's!" as well as more severe physical punishments, condition the little child against certain types of situations, and create attitudes which are gradually consolidated with specific habits and with ideas in "moral traits" such as honesty and unselfishness.

² BONHAM, MARTHA, and SARGENT, MAE K., *A Study of the Development of Personality Traits in Infants Eighteen to Twenty-four Months of Age*. Master's thesis in the library of the Catholic University of America, 1928. Briefly summarized for the author by Dr. Paul H. Furfey.

The development of traits is early supplemented, of course, through more complex sensory-motor learning. Punctuality is favored through the establishment of regular habits of getting up in the morning, coming to meals, and the like, and the more consistent the training the better laid is the foundation for this trait. Politeness is favored by such things as the early teaching of standard ways of greeting adults and other children, and social adaptability by practice in playing with other children in groups, and the learning of special skills usually performed in company, such as dancing and various games and sports. All this more complex learning goes on, it is to be remembered, as a means of satisfying dominant motives, and the existence of a motive, operative until enough new modes of adjustment are learned to satisfy it, is the chief basis for the unity or order in a developed trait.

Ideas, along with conditioning and the formation of complex habits, play their part in the development of traits. At first the child is conditioned against taking things by "spatting" his hands or by forcible restraint. After "no no" has become an effective stimulus, the child may think "no no" in the absence of an adult when gazing at a desired object, and refrain. From this time on thinking plays a part in the development of honesty. The effects of some acts may be ideationally represented by the child, with help from adults, and thus ideational learning, or a primitive sort of reasoning, is a factor in the formation of attitudes and habits.

A little boy not quite six once brought home a pretty little dish which he had taken from the counter of a store. His father talked with him about it, and finding that the child believed the storekeeper would not miss it, explained carefully how the man made his living, and how hard it

would be if many dishes were taken. He also pointed out that the storekeeper would feel badly to know that it was he who took the dish. The father and child went back to the store and returned the plate, the latter saying with much effort that he was sorry. The boy in question, now a grown man, recalls how greatly this incident impressed him, how he thought afterward about the storekeeper's work to support his family, and how he longed to be a boy whom his father as well as the storekeeper would trust. Here knowledge of the consequences of a particular act, and reasoning about the results of future similar situations, aided, along with the concrete act of returning the dish, in developing a more systematic attitude toward taking things. From now on the ideal of being a trustworthy person persisted, and tended to function whenever it was a case of taking an article from someone else. It was now incorporated with other learned habits and ideas as a part of a motivating trait. In this case the boy had been aided in making that rational analysis of a new situation which Hartshorne and May believe to be the essential factor in consistently ethical conduct. But the analysis was not yet complete and the power of generalizing still much limited; the boy did not learn for years to regard as dishonest the taking of articles from corporations the personal representatives of which were not present to be hurt by such acts.

Interrelationships among Traits.—Since the organism is so constituted that it tends to function as a whole, we shall not expect to find hard and fast lines between traits. A trait is a relative and a functional grouping of habits and attitudes, and so we shall expect to find overlappings and groupings of various sorts.

Certain more general groupings of traits have been experimentally studied. Prominent among these are the two

antithetical groups commonly referred to as extroversion, or the tendency to be interested in external reality and to make overt adjustments readily; and introversion, or the tendency to center attention on feeling and thought to the neglect of overt adjustment. Among traits said to be expressive of introversion are self-depreciation, sensitiveness to the opinions of others, outspokenness, radicalism, reticence, absent-mindedness, meticulousness, moodiness, self-consciousness, imaginativeness, and dislike of prominence in groups. Extrovert traits are the opposite of these.

Jung, the psychoanalyst who first proposed these terms, used them as applying to distinct and complementary types of personality, the implication being that all people could be classified as either extrovert or introvert.³ Experimental and statistical studies of adults have not supported the theory of distinct introvert and extrovert types.⁴ It has been found that there are well marked general groupings of such traits as Jung described, and that most people show a tendency, *on the average*, to verge either toward the introvert or the extrovert side, when rated on the various traits by close acquaintances or scored on objective tests of these traits. But the organization of traits is very loose, and in general any one person will tend towards "extroversion" on some traits and towards "introversion" on others. If the scores or ratings of a group of individuals on any one trait are plotted in a distribution curve, we get an approximately "normal" distribution similar to Allport's curve for ascendance-submission. If the theory of types held good, we should get a bi-modal curve; that is, the scores would be

³ JUNG, CARL G., *Collected Papers on Analytical Psychology* (Moffat, Yard, 1917).

⁴ FREYD, MAX, "Introverts and Extroverts," *Psychol. Rev.*, 31: 74-87 (1924); HEIDBREDER, EDNA, "Measuring Introversion and Extroversion," *Jour. Abn. and Soc. Psychol.*, 21: 120-134 (1926).

concentrated at two points, one on the side of the baseline representing extroversion, the other on the opposite side. The fact of normal distribution, with most scores clustered in the middle and a gradual falling away in the number of individuals possessing the more extreme degrees of the traits, indicates that the terms extroversion and introversion do not correspond to types at all, but can be properly used only as referring to extremes in a normal distribution.

Since the position of an individual on a scale varying from extreme introversion to extreme extroversion represents merely an average of ratings or scores on a large number of traits; since the great majority of people will be introverted on some and extroverted on others; and since in only a very few unusual individuals will there be extreme ratings in the same direction on a large number of the traits, it is clear that the terms introversion and extroversion have a distinctly limited use as applied to individuals. Nevertheless, if their limitations are kept in mind, the terms are useful as indicating the presence of somewhat generalized tendencies to respond in the manner of more specific traits, much as ascendance means the presence of a general tendency to behave in a dominant way on the basis of specific habits. We might thus think of traits as systems of habits, and apply the name "type-traits" to systems of traits.

"General emotionality," "nervousness," or "emotional instability" are terms applied to a constellation of traits and habits which might be thought of as a type-trait, though perhaps on a lower level, that is, inclusive of fewer contributory tendencies than introversion, to which it is related. The questionnaires designed to measure this tendency (modifications of the Woodworth psychoneurotic inventory, described in chapter xii), deal for the most part with specific habits of thought or of action, for example,

"Do you have a light in your room at night?" "Do you ever wish you had never been born?" But a number of items deal with more general tendencies, as illustrated in the questions, "Do you usually know just what you want to do next?" "Do you have a hard time making up your mind about things?" and "Is it easy to get you cross over very small things?" Some of these same tendencies are also measured in investigations of introversion.

Now studies which have been made on emotional stability (or instability) show that the various "nervous" symptoms and tendencies are possessed in different degrees and combinations by different individuals. No individual, child or adult, is entirely free from all these symptoms. In an unselected group of children or adults a small number will be found relatively free from the symptoms, and a correspondingly small number will exhibit a great many, while most individuals in the group will fall within a middle range. There is a gradual progress from emotional stability to emotional instability, as measured in these questionnaires. Hence emotional stability is a matter of degree. It does not represent a distinct type, but rather a loosely organized tendency which we might call a type-trait, or simply, perhaps, a trait of a more general order than such traits as punctuality and obedience.

Although it is clear that there are significant larger groupings of traits within the total personality, and that these represent different levels or orders of organization, there seems to be no good evidence for the existence of distinct personality types. What we have said of the objections to considering the extrovert and the introvert, the emotionally stable and the emotionally unstable as types probably applies equally well to other proposed types. Where thorough statistical studies have been made, the supposed types

have turned out to be extremes of a fairly normal distribution, and well defined boundaries between the various possible ratings or scores are not found. Thus in any unselected group there would be very many more exceptions, than individuals who even approximated the types. This being the case, it is highly questionable whether the concept of types is a useful one for psychology.⁵

It is an interesting question to what extent traits of higher levels, or type-traits, are present in young children. Leslie R. Marston has shown that tendencies toward extroversion and introversion, as measured by ratings on twenty pairs of traits based on a standard list of Freyd's and by a series of objective tests, are well marked in preschool children.⁶ His directions to the raters of the children were purposely so phrased as to discourage median ratings, and hence his curves show a bi-modal distribution, which, since artificially produced, does not afford evidence for two distinct types. Nevertheless the average ratings made independently by two to five observers for each child show in an interesting way the difference in estimated amount of introversion from trait to trait. Figure 25 shows how far from consistent the tendency toward introversion or extroversion is likely to be for an individual child. Notice, for example, that one subject is rated at almost the extreme of extroversion on trait number eight (showing self-confidence and initiative); while on trait number eleven he is rated as definitely 'introverted' (meaning that he is sensitive and easily "hurt").

Marston devised five experimental situations to obtain objective tests of prominent traits among the twenty pairs.

⁵ See THOMAS, W. I. and D. S., *The Child in America*, pp. 480-489 (Knopf, 1928), for a discussion of Kretschmer's theory of types, and of studies inspired by his work.

⁶ MARSTON, LESLIE R., "The Emotions of Young Children: an Experimental Study in Introversion and Extroversion," *Univ. of Iowa Stud. in Child Welfare*, III, No. 3, pp. 7-99 (1925).

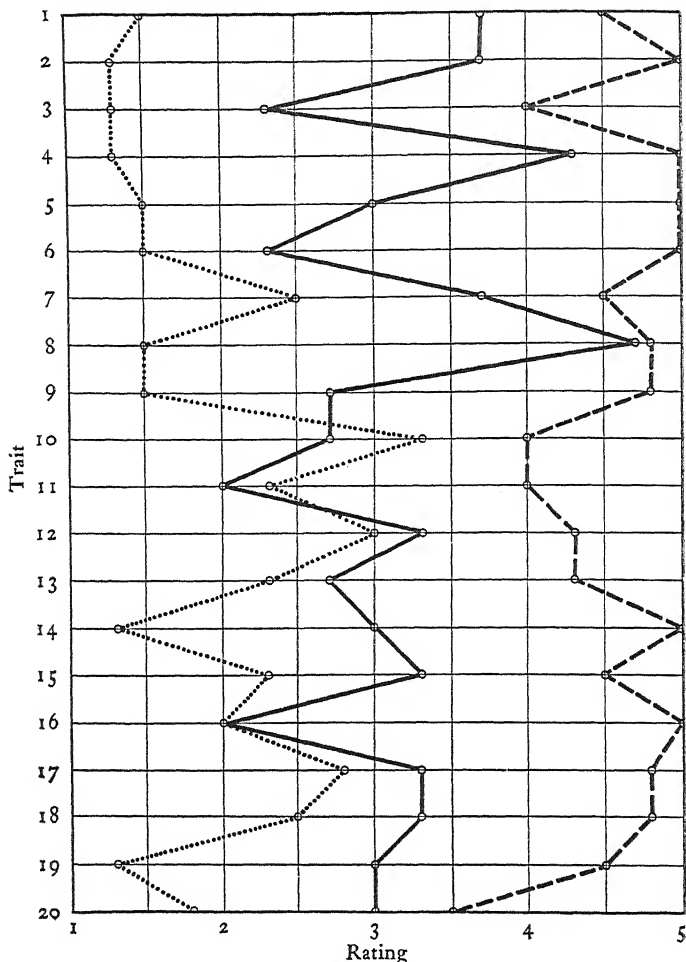


Fig. 25. INDIVIDUAL PROFILES OF THREE BOYS

One boy tends toward introvert ratings (.....), one toward median ratings (——), and one toward extrovert ratings (-----). The light vertical line through the center of the chart represents the theoretical balance between introversion and extroversion, rating 3. The left and right boundaries represent respectively the extreme of introversion, rating 1, and the extreme of extroversion, rating 5. The profiles connect the points on each of the twenty lines corresponding to the average scores on the respective traits. (Reproduced by permission from "The Emotions of Young Children," by Leslie R. Marston, *Univ. of Iowa Studies*, Vol. III, No. 3, 1925.)

For example, compliance and its opposite were measured by the child's reactions to the experimenter's request that he open a box with fastenings so complicated that the task was impossible for him; and degree of interest in external objects was measured by recording the number of stops made by a child when allowed to explore an animal museum which he had never seen before. The responses of the child to the five carefully standardized situations were scored according to a definite plan as to degree of introversion or extroversion shown. Marked individual differences were found. The fact that the performances of the group of children on the various tests showed intercorrelations ranging in general from $+ .30$ to $+ .50$, and that there were correlations averaging about $+ .50$ between test scores and ratings, shows that there were in these children more or less consistent groupings of the forty traits into type-traits which may be called extroversion and introversion.

The fact that such definite interrelationships among traits as these were found well established among children between two and six years of age supports the opinion of leading psychologists that it is in the first five years or so that the dominant trends of the personality are established. Published case studies of young children, based on observation in schools and clinics, also support this generalization; and further carefully controlled experimental studies are revealing the presence of persistent tendencies. Dr. Charlotte Bühler, studying a large group of babies under one year of age, concluded that some of these personality tendencies are well established by the end of the first year. Investigators at the University of Minnesota are obtaining objective data on the social behavior of nursery school children which show striking and persistent individual differences in such behavior. Some nursery school children are consistently

dominant in social groups, others are distinguished for their primness and orderliness, still others characteristically adopt pleadingly submissive attitudes.⁷

It thus appears not only that there is considerable ordering or association of traits, but that this ordering is under way in the earliest years. Experimental and clinical studies, supplementing keen observation in homes and schools, already enable us to point out what are probably some of the most important factors determining the shaping of basic traits and their organization into more general trends. Our knowledge on many points is still far from exact. We are, in fact, barely beginning research in this wide and important field—but we may find helpful guidance not only in the systematic research which has been done but in generalizations based on clinical and other first-hand observation.

SPECIAL CONDITIONS INFLUENCING THE DEVELOPMENT OF TRAITS

IN SUMMARIZING the conditions which influence the development of traits we shall for the most part, in the absence of experimental analysis, have to use popular terminology in referring to those traits. We shall use the terms trend or tendency interchangeably with the word trait; and we shall make no attempt, in this rather general treatment, to deal separately with traits of lower or higher levels.

Physical Conditions.—Among conditions favoring the development of certain traits rather than others, those which

⁷ VERRY, ETHEL E., "A Study of Personality in Preschool Play Groups," *Jour. of Social Forces*, 3: 645-648 (1925); WOOLLEY, H. T., "Personality Studies of Three-Year-Olds," *Jour. Exper. Psychol.*, 5: 381-391 (1922); BÜHLER, CHARLOTTE, "Die ersten sozialen Verhaltensweisen des Kindes," *Sociol. und Psychol. Stud. über das erste Lebensjahr*, pp. 1-102 (Quellen und Studien zur Jugendkunde, 1927). Some of this work is summarized by Thomas and Thomas, *op. cit.*, pp. 518-534.

may be classified as physical factors are sometimes of great importance. General good health and what we call, rather vaguely, "vitality," may be a factor in the development of such characteristics as cheerfulness, impulsiveness, optimism, and aggressiveness. A low degree of vitality, on the other hand, may be one among other conditions which favor, according to the circumstances, lack of confidence, introspective tendencies, moodiness, slowness, dignity, sadness, or pessimism. Although the weak and the ill may be mentally alert and aggressive, and sound and healthy people may become moody or depressed, listless, and lacking in confidence and initiative, still good physical condition is certainly a powerful factor in the development of "mental buoyancy."

Very often peculiar physical defects have a noticeable effect on the growth of personality. The psychoanalyst Alfred Adler has urged that a person with some special physical defect unconsciously tends to compensate for it, or as we might prefer to say, to overcompensate for it, by developing some complementary trait.⁸ Thus a short person may be loud voiced and dignified. A child who is or who thinks he is ugly, stunted, or otherwise inferior physically to his companion develops compensatory trends which may shade over into delinquency or abnormality. Adler has maintained that these physical defects are usually related to defects in the sex apparatus, and that the unconsciously exerted effects of inferiority in the sexual sphere profoundly affect the growth of personality. According to Adler, since all children are immature sexually and undersized in comparison with their parents, they have a certain "inferiority complex" which threatens normal personal development unless wisely dealt with.

⁸ ADLER, ALFRED, *The Neurotic Constitution* (Moffat, Yard, 1917); *A Study of Organ Inferiority and Its Psychical Compensation* (Nervous and Ment. Dis. Publ. Co., 1917).

This concept of physical inferiority as a factor in the development of compensatory traits has illuminated some obscure problems of personality. Psychologists have found it usefully applicable in many cases, but in their hands the theory has undergone important modifications. They see no reason for limiting the discussion to organic conditions. A sense of inferiority related to other than physical defects or failures may have important effects on a child's development. Clinical and case study has shown that in certain children failure to keep up with the others in school, lack of popularity, sense of moral guilt, and other non-organic factors may favor unwholesome compensatory activities. Again, organic inferiority by no means inevitably results in an inferiority complex, although there is good experimental evidence that it tends in that direction.⁹ The theory that all children tend, as inferior to their parents, toward compensatory adjustments, is generally regarded as far-fetched. Nor is the implication justified that compensatory adjustments are undesirable as such. In general, overcompensation which is not recognized for what it is, is likely to be unwholesome, but some compensatory traits, even though unconsciously developed, may be highly desirable—as, for example, the sweetness of manner sometimes, but not always, found in very plain children. Sometimes the deliberate strengthening of an existent trait for purposes of compensation results in desirable improvement in personality.

It is clear that the effects of a physical defect on personality development will depend upon a good many circumstances, including the general physical condition of the child, his intelligence, the attitude which various others assume toward his defect, and the attitude which he is encour-

⁹ FATERSON, HANNA FAY, "'Organ Inferiority' and the Inferiority Complex," unpublished study soon to appear in a psychological periodical.

aged to assume toward the attitudes of others. One child, ridiculed at school because of a disfiguring birth-mark, may become self-conscious and socially timid. Another with the same sort of defect may respond with good-natured counter-attacks, and be all the more popular with his fellows because of it. Still another, though he does not actually hear taunts or pitying comments by others, may imagine them, and unconsciously develop an arrogant and superior manner as a way of maintaining himself in the social group. Obviously a good deal of control is possible in this matter.

According to current popular tradition, certain types of physical features are associated with personality traits. This theory is implied in the expressions "aggressive brow," "weak chin," "deep-set, far-seeing eyes," and the like. It is sometimes assumed that a small-boned person, or one with fine, soft hair, is capable of finer feelings than a large-boned person, or one having coarse hair, that full lips mean sensuality, and that small eyes mean greed. Some have claimed that there are important differences in personality traits between blondes as a class and brunettes.

Where scientific investigations of such theories have been made, the results have shown them to be without foundation.¹⁰ Profiting by the lessons learned from the collapse of the older phrenological doctrines and the more recent demonstration of the falsity of the Lombrosian doctrine of the physical stigmata of delinquency, we have good reason to refuse to entertain such theories as reasonable hypotheses. Because of their social importance, however, they should be carefully investigated. This is because of the harm that may come to the individuals and to members of certain racial groups through mistaken attitudes based on these prejudices.

¹⁰ See for example PATERSON, D. G., and LUDGATE, KATHERINE, "Blonde and Brunette Traits, a Quantitative Study," *Jour. Personnel Research*, 1: 122-127 (1922).

The author knows of one person who suffered all through her girlhood from sensitiveness over her receding chin, which members of her family believed was a sign of lack of initiative as well as inferior intelligence. That this girl actually did grow up somewhat lacking in initiative and became easily discouraged at school although she did good work, her friends believe was due in part to the attitude of her family. Certainly she has at least average intelligence. As an adult, she has to some extent overcome her early "inferiority complex," but it has greatly handicapped her.

We do not have accurate knowledge about the relation between ductless glands and personality traits. It is known that excessive secretion of the thyroid is connected with overemotionality and general overactivity; and it is probable that other glands than the thyroid also have important influence on personality. But as to what is the nature of such influences, how they may be exerted, how they vary from person to person, and what degree of control is possible, we know at present little or nothing. Certain popular books, purporting to tell how glands regulate personality, may well be read as a sort of intellectual play, but it is to be remembered that they are highly speculative. We may entertain the hope that sometime a more exact knowledge will enable considerable control in the case of children suffering from remedial under- or over-functioning of glands, a malfunctioning which may affect personality as well as physical development. It does not seem likely that glandular treatment will ever prove an important means of influencing the development of personality traits in normal children, although a knowledge of certain relationships between glands and personality which may some day be available may quite possibly aid in the attainment of greater understanding of individuals.

Among physical conditions which have an important influence on the development of personality are the growth changes of puberty, including the functioning of sex glands as well as general growth in the sex organs. There is no evidence that any new personality traits are "born" at this time, as G. Stanley Hall suggested, but certain ones which involve positive attitudes toward other people are undoubtedly often greatly modified or strengthened. The newly developed emotional responses to internal stimuli now come to be aroused by those individuals or those classes of people toward whom the child has already been trained to respond positively. Thus a normal adolescent is likely to feel increased affection for his parents, unless their attitude is antagonistic, and for his family and friends. Toward members of the opposite sex, if his training has been normal, his strongest feelings will be directed, but he will also respond with greatly heightened interest to any other classes of people whom he has learned to appreciate — let us say to children, to the feeble or the old, to people of other countries, or to humanity in general. Especially if during his adolescent years he receives teaching which points out the needs of these other people he may become passionately devoted to their interests. Thus at this time such traits as loyalty, sympathy, tolerance, and unselfishness — altruism in general — may undergo a rich development.

The youthful and often extravagant enthusiasm engendered at this time is usually recognized as symptomatic of a "stage" through which the boy or girl is passing; and it sometimes happens that unsympathetic adults maintain a coldly analytical attitude towards the child, make fun of him, or else show indifference to his enthusiasms. Such an attitude may arouse in the youth rebelliousness, intolerance of adult ways, and radicalism in general; it may encourage

a tendency toward introverted attitudes — seclusiveness, day-dreaming, and aloofness from others; or it may foster a disillusioned cynicism.

Among other traits which may be augmented or modified in adolescence are aggressiveness, related to the feeling of power and strength connected with physical changes, moodiness as a result of complex and shifting alterations in emotional tone, and self-consciousness, shyness, and depression arising from sexually based conflicts. Quite possibly the intensity of the idealism prevailing in some adolescents is due in part to unconscious overcompensation for what seem to the individual to be shameful sex feelings.

This brief reference to the importance of the physical changes of puberty as factors in the development of traits suggests that in adolescence a great deal may be done, through wise guidance, in the way of developing and organizing important special traits for which a good foundation has already been laid.

Differences in Intelligence. — Extensive study, in recent years, of bright and dull children indicates that intelligence is by no means so important a factor in personality as has often been supposed. The long prevalent assumption that the exceptionally bright child is likely to be not only inferior physically, but unduly serious, one-sided in his interests, introspective, and more or less unpopular with his fellows, has not been supported by factual investigations. On the average, very bright children are found to be superior physically to ordinary children, and they seem also to have the same general range of personality traits as the latter. Although they tend to prefer more intellectual types of amusement, their play life is entirely normal, and there is no evidence that they are, on the whole, inferior in

social adaptability and in popularity among other children.¹¹

In individual cases, of course, high intelligence may be a factor in the growth of certain traits. If a child is much superior in intelligence to brothers and sisters, or to one or both of his parents, he may, if the family situation is "favorable," develop such traits as conceit, "bossiness," or selfishness. On the other hand, in certain cases adults, fearful of the development of such traits, may, by keeping the child aware of his defects in other respects, foster a sense of inferiority and social inadequacy. Thus intelligence may indirectly condition personality development.

A more acute problem than that of the bright child among average or inferior children is the situation of the average or dull child of very bright parents, or one who has a brighter sister or brother. Such a child, as is illustrated in case studies over and over again, may develop feelings and ideas of inferiority which may profoundly affect his life. The situation is likely to be especially unfortunate if the child is expected to maintain a standard set by a superior brother or sister, to follow in the steps of his brighter parents, or to achieve their unrealized ideals. Children are being constantly urged to school and vocational accomplishments literally beyond their ability, and sometimes the consequences of such a policy are serious. On the other hand, in view of the impossibility of determining just what is the native capacity of the child, one might urge that it is better to run the risk of expecting too much than too little.

If the bright child has an essentially normal personality there is evidence that so also has the dull child, providing

¹¹ TERMAN, L. M., *Genetic Studies of Genius*, Vol. I, *Mental and Physical Traits of a Thousand Gifted Children* (Stanford Univ., 1925-26); HOLLINGWORTH, LETA, *Gifted Children* (Macmillan, 1926).

he is above the level of imbecility or idiocy. In a study of the adjustment during a five-year period of sixty-eight retarded children, half of whom had *I.Q.*'s below ninety and eight of whom had *I.Q.*'s below fifty, Kinder and Rutherford found, contrary to their expectation, that there was relatively little correlation between the degree of retardation and social adjustment.¹² Powers applied the Marston introversion-extroversion rating scale to eighty-nine mental deficientes aged eleven to sixteen years, with median *I.Q.*'s of sixty-four, and found almost perfect correspondence with Marston's results. Such studies as these suggest that in children the development of characteristic personality trends is to a considerable extent independent of the *I.Q.* Many case studies show that even very dull children develop clear-cut "inferiority complexes," moody dispositions, and traits of obstinacy, persistence, and the like. They also manifest well defined traits of impulsiveness, loyalty, courage, imaginativeness, and seclusiveness.¹³

Although future statistical investigation may show that dull children score significantly lower on the average in some special traits, such as initiative and leadership, case studies and experimental investigations already made indicate that dull and even very dull children probably have essentially normal feelings and normal capacity for developing the ordinary range of personality traits. We might suggest that the chief effect of lower degrees of intelligence on personality traits would not be likely to make itself felt until the years of early adolescence, for it is probably not until

¹² KINDER, ELAINE F., and RUTHERFORD, ELIZABETH J., "Social Adjustment of Retarded Children," *Ment. Hygiene*, 11: 811-833 (1927).

¹³ POWERS, NELLIE E., "An Application of the Marston Introversion-Extroversion Rating Scale," *Jour. Educ. Psychol.*, 19: 168 ff. (1928); FOSTER, J. C., and ANDERSON, JOHN E., *The Young Child and His Parents: a Study of One Hundred Cases* (Univ. of Minn. Press, 1927).

then that the child himself takes any very active part in rationally controlling the development of his personality. On this theory we should expect that the older children and adults who have less than average intelligence would tend to have less effectively integrated personalities than more intelligent individuals.

On the whole, however, we may conclude that the degree of intelligence possessed by a child is not in itself a decisive factor in the growth of the ordinary personality traits, although it may have a good deal to do with the effectiveness of integration in the later years. But the attitude taken by the parents, by teachers, or by the child himself toward his intelligence as compared with that of others is likely to be, in many cases, very significant. The importance of the *I.Q.* has undoubtedly been exaggerated by psychologists and by parents in recent years, and it is a hopeful sign that interest seems to be shifting toward problems of personality.

Position in the Family. — It is often assumed that position in the family is a decisive factor in the development of special traits. For a good many years writers have dwelt on the dangers to which the only child is exposed. Brought up with more adult than child companionship, the center of attention, spoiled by overaffectionate parents, the typical only child is said to be selfish, lacking in initiative, and overemotional, with a tendency toward nervous instability and less than ordinary ability to get along with others. The oldest child in a family is liable to be, some writers have said, domineering and aggressive, a younger child is likely to have an "inferiority complex," while the youngest again is exposed to the dangers of spoiling and overattention. There has been some disagreement as to the characteristic traits, but the above statements represent common opinions.

Recently statistical investigations, which are the final test

of the validity of such generalizations, have shown that the importance of the factor of position in the family has been exaggerated. Studies by means of ratings and tests of groups of only children from kindergarten to college indicate that *as a group* they are essentially normal. But it is significant that some investigators have found more instability of mood among only than non-only children, and a number agree in finding the only children more aggressive and self-confident.¹⁴ We may conclude that the great dangers to which the only child is subject are largely imaginary, and that intelligent parents by the exercise of forethought and care can guard against those that do exist.

Nor does statistical study of other "positions in the family" show that they are compelling factors in the development of special traits. The study by Goodenough and Leahy of two hundred and ninety-three kindergarten children rated by teachers on a number of personality traits including selfishness, social adequacy, and the like reveals insignificant differences between oldest, middle, and youngest children on nearly all the traits. The oldest children showed slightly greater tendency toward lack of aggressiveness, the middle children the same tendency in a less degree, and the youngest children no outstanding characteristics. Bender in a study of college students found no statistically reliable correlations between scores on the Allport ascendance-submission test and position in the family.¹⁵

While experimental studies of the effect of position in the family on personality traits are, as yet, few, and the evi-

¹⁴ GOODENOUGH, F. L., and LEAHY, A. M., "The Effect of Certain Family Relationships upon the Development of Personality," *Ped. Sem.*, 34: 45-71 (1927); FENTON, NORMAN, "The Only Child," *Rev. of Reviews*, 76 (January, 1928).

¹⁵ GOODENOUGH and LEAHY, *op. cit.*; BENDER, IRVING E., "Ascendance-Submission in Relation to Certain Other Factors in Personality," *Jour. Abn. and Soc. Psychol.*, 23: 137-143 (1928).

dence conflicting, one may still conclude that the importance of the influence of the other "positions in the family," as well as that of the only child, has probably been exaggerated. These statistical findings should not, however, blind us to the fact that in individual cases circumstances connected with position in the family may be very important. But the large number of other circumstances with which this is associated and which differ greatly from child to child prevent us from making any confident general statements as to its rôle.

"Racial" or National Differences as Factors in Trait Development. — There seems to be no denying, in spite of the lack of comparative statistical investigation, that significant racial and national differences in personality traits do exist. That the Chinese are on the whole more polite than native white Americans, negroes more submissive, the French more vivacious in manner, and the American Indian more stolid, we may, because of almost universal agreement on these points, assume. About a good many special characteristics attributed to various racial and national groups we should, however, be skeptical until more satisfactory evidence is at hand. Those who judge usually have much better acquaintance with one of the two groups compared than with the other, and are also likely to be influenced by preconceived ideas based on unreliable tradition.

Granting the existence of racial and national differences in personality, we may ask what is the likelihood that they are based on hereditary factors. Where such factors exist it would be helpful, from the point of view of those who bring up children, to know about them. If they favor desirable traits, we are glad to have an ally in nature, if undesirable traits, we wish to be all the more alert that we may exercise control from the start. Suppose we find that an

undesirable trait which has been thought to rest on hereditary bases is really the result of special environmental conditions. That will lead us to put emphasis on prevention through regulation of those special conditions. Therefore, although we realize that no mental trait is ever inherited as such — that both heredity and environment must be concerned in its development, and that in no case is a fatalistic attitude called for — still the interest in the rôle of hereditary factors in personality traits is to some extent justified.

Now in the case of racial differences in personality there seems to be no good reason for supposing that hereditary factors are of decisive importance, or likely to have much influence on the growth of personality in a child brought up away from his natural environment. There are certainly inherited differences among the various peoples of the earth in physical features such as color of hair, height, and the like; and it may be found that there are also some significant differences in physiological functioning which favor certain personality traits. We know of no such definite correlated differences at present. But assuming that they exist, it would not be necessary to suppose that they are dominant factors in the growth of personality traits; while on the other hand there are reasons for supposing that special environmental factors are very important influences in such development. In the various parts of the earth there are many and often very large differences in physical environment, and still greater differences in the social environment in which a child is brought up — differences in national traditions and ideals, in education, in political organization, in economic opportunities, and in social position as reflected in the regard in which the group is held by other groups.

This last point is often neglected. A child of a colored professor in a negro university is brought up, if he sees white

people at all, in a significantly different social environment from that of a white child of his own social class. In certain children the social stigma of being called a nigger, a dago, or a sheeny may result, according to the circumstances, in the development of submissive attitudes or a sense of inferiority, in rebelliousness, "temper," or spitefulness, in compensatory boastfulness, or in an assumed attitude of flattering subservience.

It would be interesting to compare the traits of very young children of different "racial" groups when the environment has had less chance to affect personality. Scattered observations point to the likelihood that babies and very young children of different races are very much alike, that Chinese babies are no more polite or passive than American babies, negro babies no more submissive, and Indian infants just as lacking in stolidity.¹⁶

It might be urged that the existence of great differences in native intelligence must make for personality differences in races. But we have seen that the *I.Q.* has less effect on the development of personality traits than we might suppose, and would be likely to affect the rational organization of traits rather than the form of special traits. Besides, in spite of long investigation we have not succeeded in obtaining positive evidence either for or against the existence of marked racial differences in native intelligence; and though large differences in tested intelligence are found, there is so much overlapping that it would be unfair to judge the probable capacity of individuals in the light of these general findings.¹⁷

¹⁶ BÜHLER, CHARLOTTE, *op. cit.*

¹⁷ GOODENOUGH, F. L., "Racial Differences in the Intelligence of School Children," *Jour. Exper. Psychol.*, 9: 388-397; KLEINBERG, OTTO, "An Experimental Study of Speed and Other Factors in 'Racial' Differences," *Archives of Psychol.*, No. 93 (1928). These are only recent samples from a voluminous literature.

On the whole, since we have no definite evidence that native factors are potent in producing racial differences in personality, but do have convincing reasons for recognizing the importance of environment, especially in the form of social heredity, it would seem that the wise and sensible thing to do is to assume that children of all races probably possess about equal potentialities for both good and bad traits. Certainly we can never be sure that children of any particular race or nation lack the capacity for developing a desirable trait, until we have given them a good chance to develop it. And we have no reasons for confidence that the children of the more "favored" races would not, if brought up under primitive conditions, develop primitive traits.

Sex Differences in Personality Traits. — There seems no good reason for questioning the essential correctness of the common opinion that women are, on the average, somewhat more emotional than men, more tender and sympathetic, more tactful, and quite possibly more inclined to be jealous, spiteful, and intolerant. But there is reason for questioning a common assumption that such differences are innate and inevitable. We have found after extensive investigation covering many years that the two sexes do not differ in general intelligence; and that although in certain special abilities such as arithmetical and mechanical abilities there are some differences, on the average, at certain ages, these differences are so slight that they may safely be ignored for educational purposes.¹⁸ These findings, disproving at last a tradition of ages that women have inferior intelligence, suggest that we may also find, sometime, that innate

¹⁸ GOODENOUGH, F. L., "The Consistency of Sex Differences in Mental Traits at Various Ages," *Psychol. Rev.*, 34:440-462 (1927); WINSOR, A. LEON, "The Relative Variability of Boys and Girls," *Jour. Educ. Psychol.*, 18:327-336 (1927).

differences in factors which condition personality traits are equally negligible. It does not seem at all improbable, to be sure, that certain differences in traits may be correlated with some of the innate physical and physiological differences between the sexes; but even if this is true, there are reasons for thinking that such differences are probably slight.

The special social conditions to which girls are usually subjected from babyhood are certainly very important factors, and possibly the sole determining factors, in the development of the typically "feminine" traits. Dr. Floyd Allport has cogently analyzed the process by which differences in personality between the sexes are built up, pointing out that from the first the girl is denied opportunities for personal development which are open to the boy, and that under the pressure of man-made standards of conduct human feelings rather than objective considerations are likely to become her guide. As adolescence approaches, these special restrictions and special influences become more compelling. The fruits of inhibition, conflict, and overshadowing are seen in the traits of the mature woman.¹⁹ As Allport implies, the gaining of political and economic freedom in maturity will not give a woman personal freedom from the bondage of those feminine traits, which, deeply grounded and inextricably interwoven with the other aspects of her personality, can only be materially changed through a very radical course of reëducation. It is only through a different kind of training from birth on that such undesirable "feminine" traits as overdocity and emotionality can be controlled.

It should be pointed out that boys too have suffered from the traditional theories of sex differences. There seems to be no reason why boys also should not develop the traits

¹⁹ ALLPORT, FLOYD, *Social Psychology*, pp. 345-353 (Houghton Mifflin, 1924).

of sympathy, tact, and tenderness which are so valued in women, or why they should be expected to manifest coarseness, destructiveness, and lack of appreciation of fine human relationships. Perhaps it is as unwise to make fun of little boys for playing with dolls or to call them sissies if they show a love for music, as it is to call a girl a tomboy if she climbs trees or shows an interest in electricity.

Individual Differences. — Individual differences in personality traits are undoubtedly conditioned to some extent, as the preceding discussion has implied, by differences in physique, health, general and specific learning abilities, and the like; and such differential conditions are often determined largely by hereditary factors. Environmental factors are also, of course, important in any trait, and the varying experiences which individual children have undoubtedly account in large part and in most cases for the observed differences in traits from individual to individual. But the popular faith in the power of heredity as a sole determinant is so strong that this point will bear elaboration.

A stock argument is that since children in the same family environment have very different personalities, these differences must be ascribed to heredity. The fallacy here lies in supposing that any two children in the same family have a common environment. The social environment is always different because each child is part of the environment of the other; and also wherever there is a difference in age the two children are necessarily treated differently. The attitudes of other members of the family toward the two as well as those of outsiders are likely to differ, and the child responds quickly to such attitudes. Case studies of children of the same family have shown very clearly in what strikingly different social environments the

various children of a family may grow up.²⁰ Moreover, no two children, unless they are as close together as Siamese twins, are exposed to quite the same physical environment. Sometimes even a single experience, if it makes a deep impression, may profoundly affect the personality of a child, and one child in the family may undergo such an experience, let us say a severe shock because of an attack by an animal, or an accident or illness requiring special treatment, while others escape it. Special experiences, to say nothing of the countless minor variations in environment which ceaselessly affect the child, thus make each child's world different from that of any other.

Objective study of the personality traits of identical twins reared apart should furnish a crucial test of our generalizations about the inevitable importance of environment as, to a greater or less extent according to the trait and the circumstances, concerned in the development of personality. It is to be hoped that sometime results will be obtained comparable to those of Freeman and his collaborators on intelligence. Studies on twins now being conducted by Professor Newman and associates at Chicago are furnishing interesting data.²¹

Summarizing, we may say that while hereditary factors are present in all traits, and while in the case of some traits and of some individuals these hereditary factors are undoubtedly more important than in others, still developed personality traits are largely the product of individual experience. We cannot expect by providing a favorable

²⁰ WEILL, BLANCHE G., *The Behavior of Young Children of the Same Family* (Harvard Univ. Press, 1928).

²¹ See the series of case-studies by H. H. NEWMAN, "Mental and Physical Traits of Identical Twins Reared Apart," in *The Journal of Heredity*, Vol. XX (1929).

environment materially to alter a child's general intelligence, unless in exceptional cases; but we may expect that the sort of social environment we provide for him by way of teaching, training, and example will determine not only the main trends but also special traits in his personality. We would insist that any normal child has potentialities for the development of the widest conceivable range of traits, good and bad; and that no presuppositions as to the presence or absence of possibilities for developing any trait should influence our efforts at training.

If we wish a child to develop a personality which will enable him harmoniously to satisfy his own motives as an individual in society, then it follows that we will encourage any spontaneous manifestations of individual talent or inclination or ways of doing things which do not conflict with the satisfaction of his major needs. In other words, we shall try to develop the traits of originality and independence in thought as in overt action. Special interests, recreational, vocational, intellectual, or æsthetic, and special ways of thinking and of doing things, will, whether based largely on native factors or on the ever varying experiences of the child, inevitably color the personality traits which he develops. Three children of a given age may all be equally aggressive, yet their specific ways of performing the aggressive acts are likely to be very different. One child's thoughtfulness may be shown in quiet matter-of-fact behavior, another's in demonstratively affectionate ways. Yet there may be as much "real affection" in the first child as in the second. Then, too, the way in which personality traits are grouped and related will inevitably vary from child to child; and in the same individual now one trait and now another will be in evidence according to the circumstances. In any effort to encourage "individuality," therefore, we shall

not only have an ally in the child's unique heredity, but shall be aided by the natural exigencies of living. In fact, of course, the difficult thing is not to develop "individuality," but to know how far to go in that restriction of it which is necessary for the attainment of an effectively socialized personality.

Our summary of special conditions which may influence the growth of personality will have suggested how it is that such conditions may give rise to problems and motives, which, persistently or recurrently present, make for the association of habits and attitudes into traits, and of traits into still more general tendencies. Let us, for the sake of concrete illustration, take the case of a little child with a stern and puritanical father who frequently scolds, lectures, and punishes him. The child learns, in order to forestall punishment, to obey the father instantly. He also learns to be very quiet and low voiced when with adults. He acquires a habit of starting slightly when some one speaks suddenly. Since he is often criticized for lapses in manners and morals, he becomes so fearful of making mistakes that he is very self-conscious. Finally the fact that he is repeatedly checked when doing something he likes creates in him, by conditioning, periods of depression, and he becomes a moody child, suddenly relapsing from cheerfulness when some stimulus or idea occurs which is connected with disagreeable experiences. This analysis, unduly simplified as it is, yet shows how the recurrence of certain types of problematic situations, with a common motive (let us say in this case, fear), may give rise to habits and attitudes which are more or less closely related. In this case the type-trait, if we wish to call it such, may be thought of as introversion, and various lower-level traits which comprise it are timidity, self-consciousness, moodiness, overconscientiousness, submissive-

ness, and "nervousness." The continued presence of the stern father, the repeated arousal of the emotion of fear, are thus unifying factors tending to shape this boy's personality.

In another case the trait of aggressiveness was developed in a boy partly as a result of his resentment at the treatment which members of his family received from outsiders. Hearing his parents spoken of as shiftless, and being made to feel in various ways, as he grew up, that no one expected the children, of whom he was the oldest, to amount to anything, this bright boy developed a strong desire to "show them." As a schoolboy he daydreamed of the time when he should return to the town with more money and more reputation than any one living there. In spite of many difficulties he pushed ahead until he finally more than realized his daydream. His is an aggressive personality. Besides ambition it is characterized by the traits of loyalty, pride, independence, and initiative, all developed in a total situation in which certain attitudes of others were a dominant motivating factor.

Considering the extreme complexity of inner motivation and the changing variety of environmental conditions, we shall expect to find much overlapping among personality traits. Thus self-consciousness may be a factor in submission and also in introversion; the tendency to jump at sounds, in one child, is connected with his submissiveness and is also a symptom of nervous instability. In fact, every act and every trait is indirectly related to every other act and every other trait, since it is a human individual organized as a functional unit which is behaving. The divisions between habits and traits and type-traits are relative and shifting. They are not well defined entities, but only functional relationships which are distinguishable in a total of adaptive activity.

THE INTEGRATION OF PERSONALITY

THE PHYSICAL unity of the organism, with its elaborate provisions for integrative activity, is a basis for a unity in behavior which is apparent almost from the first. The chief tissue needs, as well as numerous and complex acquired motives, provide enduring bases for the development of special trends, for systems of reactive possibilities which are all related because associated with a common underlying condition. But experiences which are not thus related to a common motive are also associated, through occurrence together in place or time; and as ideas become important in mental life, situations which are merely thought of together become as closely associated as if they had been perceived together. Thus behavior, explicit and implicit, is inevitably unified.

But unity does not necessarily imply integration. The three-months-old baby, cooing, crying, waving its hands, smiling, and kicking, is a unit, and in its behavior we see promise of future traits. The two-year-old described by Miss Verry who picked up a board and smilingly whacked a playmate over the head with it, then turned calmly to other play, was still more of an individual. In both of these two the lack of integration is a reflection primarily of lack of experience.

The woman who melts into tears on reading sentimental novels, and who is active in charity work, but who makes her husband miserable by constant complaints and is half the time harsh to her children and half the time indulgent, has attained characteristic personality traits which will probably be permanent. Knowing that she was a spoiled child, and that she so idolized her father that no one now can take his place, we can understand that her present behavior

is probably logically related to her earlier experiences. But her mental life, though it is unified, we should hardly call integrated. The same thing may be said of the paranoiac in the asylum whose whole interest centers about the threshing machine which he invented years ago to help save the farmers of the West from poverty, but which jealous enemies have prevented him from patenting. Convinced of his complete superiority to all his enemies he is not only resigned to his martyrdom in the hospital but happy in the leisure for thought and talk about his great idea, and in the appreciation which he has got at last. His mental life is appallingly unified.

We may call a personality integrated to the extent to which it is understood and rationally organized by the individual himself. Since reflective thinking always originates in a problematic situation, this conception implies that integration depends upon the persistence of motives which are in process of satisfaction. We have seen that traits represent systems of reactive possibilities built up in the process of learning how to adjust to recurrent problematic situations of a similar nature; and how larger groupings of traits are developed in connection with life situations peculiar to the individual child. The traits and groupings of traits once formed, themselves function as motives which play a part in the further integration of experience. Personality may thus be conceived as a hierarchy of traits, the final integration of which implies a dominant motivating basis in some aim for the conduct of life as a whole.

According to this conception integration in personality is a matter of degree. It is a slow process, beginning in early childhood, continuing indefinitely, and never complete. The building up of a single trait proceeds at first on the basis of what we may call associative syncretism. The

various aspects are unified in the course of experience, but the child does not understand the relation between various habits and attitudes which comprise it, or the reasons for acting as he does. It is only when he begins to generalize from his experience, and standards, desires, sentiments, purposes, or ideals begin to take shape, and when he learns to judge new situations in the light of these generalizations, that integration is possible.

We may see the beginnings of this "thoughtful" organization of experience around motivating ideas in very young children. It is reflected in such scornful remarks as "He isn't nice — he sucks his thumbs !" and "My father doesn't do that way !" One little three-year-old girl, out walking with her mother, listened with interest to the latter's conversation with a friend who stopped them on the street. "How pretty your little girl is !" the friend remarked. At this the child stepped in front of the lady, drew herself up, and said, slowly and with emphasis, "No, Lucy not pitty — Lucy jus' good an' best !" The reader will not be surprised to learn that as an adult this girl is indeed very good. Another little girl, a four-year-old, appeared greatly shocked at seeing her guest, the author's daughter, aged just two, rush across the room and snatch a sandwich she was not supposed to have. "Nancy, you mustn't do that ! Nancy's a naughty girl !" she exclaimed. The author explained that Nancy was too little to know better, but that she would soon learn. "Oh, but when I was little, *I* didn't do that !" insisted Betty. She was able not only to generalize, but to make a rational analysis of a new situation.

To the extent to which any trait is "thoughtfully" organized, and specific acts judged in the light of their general relation to a standard of conduct, integration is therefore being achieved. In early years there will be foci of integra-

tion, as it were, aspects of behavior which are organized around leading interests. But these will not be thought of in logical relation to each other: the unity of the personality will still be based on syncretism, we may say, rather than on synthesis. As the child acquires more general interests, however, as his personality is characterized by more inclusive and general systems of traits, there will be a basis for a more general type of organization. But according to our conception successful integration of the whole personality cannot begin until the child has acquired some conception of himself as an individual in relation to other people, and some general idea or plan of what he wants to make of himself. Such an objective conception of himself the average child does not acquire until the age of twelve or so, if we accept Piaget's analysis. Some, for lack of knowledge or of training or of sufficient innate intelligence, never acquire it, and hence can never have well integrated personalities. They may as adults have desirable personality traits, and distinct individualities, but their outlook on life remains essentially childlike and naïve.

Even after that conception of the self has been acquired which provides the motivation necessary for complete integration, the integration does not follow as a matter of course. The task of organizing all one's thinking and one's conduct in relation to a plan for life as a whole is likely to be very difficult. In fact, of course, so limited are the resources of human thought and so many are the difficulties, that a type of organization which is completely satisfying to the individual is rarely if ever achieved.

With the chief conditions which stand in the way of successful integration we have dealt in earlier parts of this book. Many types of adjustment acquired in early life may interfere with the satisfaction of later interests. Those which are

earliest acquired are likely to be most serious. One reason for this is that their origin is likely to be forgotten, a circumstance which will stand in the way of later reëducation, for the accomplishment of which a clear knowledge of the chief circumstances is essential. Another reason for the greater seriousness of these early experiences is that they are likely, especially if repeated or if profoundly disturbing, to become so intricately interrelated to later adjustments that any thoroughgoing attempt at reform involves a rather general reorganization of the personality.²²

The disintegrating effect of childhood fears is a factor in the difficulties of adjustment of many normal individuals, who often do not realize their source. An unusual case, that of Professor William Ellery Leonard of Wisconsin, whose childhood fear of locomotives and of leaving home, among other fears, profoundly affected his whole life, illustrates the mechanisms concerned, as well as the difficulty of treatment, and points to the great importance of careful preventive training. In *The Locomotive God*, Leonard gives a detailed and most interesting account of his years of effort to achieve a rational understanding of himself. The basic fear of a locomotive, acquired when he was less than three years old, was the result of an experience which would seem entirely ordinary to most adults, but which was terrifying in the extreme to this sensitive child, who lacked the equipment for giving it a rational interpretation. Later experiences while he was still a young boy added to the range and intensity of his fears. Now a middle-aged man, he is, although brilliant and highly successful in his life work, still handicapped by irrational fears — unable, for example, to go more than a certain distance from his home. He has made some progress in understand-

²² CARR, HARVEY A., *Psychology*, p. 345 (Longmans, 1925).

ing himself, with a possible increase in efficiency and happiness, but has not been able to achieve the complete insight which is perhaps a necessary basis for cure.²³

We have seen that positive emotional attachments also may interfere, in varying degrees, with the achievement of integration. Extreme devotion to parents and members of the family fostered by too much attention and sheltering on the part of the parents, may, for example, interfere with normal adjustment in married life, and occasion conflicts with which it is very difficult to deal.

Over-strict training in habits of thinking is inimical to the rational growth of personality. Effective integration requires above everything a freely varied attack, and any conditions which favor the foundation of intellectual prejudices, "fixed ideas," or "logic-tight compartments," set up serious barriers to reasoning. These irrational habits of thought are often very difficult to deal with even after the individual recognizes their unreasonableness, because they are built up in connection with situations in which emotional factors are important, and because, therefore, they are parts of more general sentiments which are of dominant importance in the personality. For example, one's convictions about the abilities of certain foreign groups may be related to childhood dealings with rough immigrant youngsters in a city school; one's passionate belief in the badness of a certain sort of conduct may possibly be the unconscious outgrowth of unsuccessful attempts as a child to deal with it in oneself; and one's religious ideas may be sacred because they are those of beloved parents. Conflicts resulting from over-rigid early training in thinking are common among adolescents in college, and adjustment to them is not always obtained by

²³ LEONARD, WILLIAM E., *The Locomotive God* (Century, 1927). See also TAYLOR, W. S., and CULLER, ELMER, "The Problem of *The Locomotive God*," *Jour. Abn. and Soc. Psychol.*, 24: 342-399 (1929).

rational thought. The individual may simply turn to some other authority than that of his early years, and continue his compartmental thinking. Or he may after a while lose interest because of absorption in other things which have come to seem more important. If the motivation is strong, however, he is likely to continue until he has achieved a solution which seems reasonable to him. Major conflicts of this type, such as that between certain religious beliefs of childhood and a scientific view of the world, may continue indefinitely. Rarely they may be so severe as to result in a temporary or even permanent disorganization of personality.

In a previous chapter we have shown that play in general is important in favoring integration, not only at the lower levels, as "making the mind more fit for apprehending many things at once," but in content, as furnishing helpful suggestions for the solution of problems and the resolution of conflicts. In the present chapter we may call attention to the peculiarly integrative value of certain forms of play in making for the higher integration which involves the ordering of the whole personality with respect to some general plan. Daydreaming of the compartmental sort which achieves the satisfaction of isolated desires without reference to conduct as a whole may often in the long run, we have seen, be positively disintegrating; but there is a constructive type of fantasy which is of the utmost importance for the growth of personality. When a child attains a conception of the sort of thing he would like to do, or the sort of person he would like to be, he tends to imagine himself as going through the activities involved, pictures their effects on others, and the rewards they will bring to him. In dwelling on the imagined activities he comes better to appreciate their significance, and to appraise other acts as related to these; and thus the daydream serves both as a motivating

factor in organizing his thought along definite lines, and as a stimulus to overt action when imagined situations present themselves. The small boy who has daydreamed of helping old ladies across the street, or of rescuing children from burning buildings, or of becoming a first-rate surgeon, is more likely to respond in kind in actual situations than one who has never entertained these fantasies. We may raise the question whether a child could ever attain that plan for his life as a whole which is the starting point of true integration, if he were not encouraged to let his thoughts range freely, at times, beyond the bounds of immediately practical problems into a freer world of his own imagining. It is in that world that the child, an artist for the time being, forms the pattern for his own life.

Art in general is play which is likely to be highly integrative: some forms of art, such as music and dancing, perhaps largely because they so very effectively raise the "hedonic tone" of the individual; other forms, especially drama and fiction, chiefly because of their content. These latter supplement the instruction of the home and school and the more valuable actual social experience of the child, in that they are fertile sources of constructive daydreams. Some "artistic activity," of course, may be actually disintegrating in the long run, in so far as it encourages narrow ideals and prejudiced thinking. But in the best drama and fiction, and in that biography which gives a living picture of a man's whole life, we have a powerful integrative force.

We are now in a position to see clearly that reasoning is the *sine qua non* of integration. Since the first reasoning of the child is very crude, and it is not for many years that he is able to achieve that completely rational thought which involves a freely varied attack and the logical comparing and testing of hypotheses, it follows that genuine integration

is not possible in the average child until he is approaching adolescence.

Piaget has shown that the young child is not only illogical in his general manner of thinking, but that the special concepts which he has are vague, unanalyzed, and contradictory. He does not at first even distinguish between himself and the world, or realize that his thought is merely subjective activity of his own, powerless to affect objects except through action. He thinks at first that his thought can influence events, that the sun and moon and wind, the rivers, trees, and rain, exist for his benefit. Later, leaving the stages of magic and animism, he believes still in an artificialist explanation of the world — that all things were made by men and for men. And when he acquires religious ideas he endows God with the power of human beings. It is only with great difficulty that the child finally arrives at the notion that objects and events are related independently of human beings.²⁴

That the thinking of all normal children is at first as primitively anthropomorphic as the thinking of Piaget's boys and girls of Switzerland seems extremely probable. How could any child, no matter how gifted, be expected to pass from the infantile stage of thought which is much more primitive than that of the lowest savages, into the logical ways of thinking of highly civilized adults, without crude transition stages? Nor should we be surprised to find that many children never do reach the higher stages. Even if the average child does finally, at about the age of twelve, correctly answer questions about the origin of clouds and trees, and shows at last a somewhat adequate conception of physical causation, that does not mean that he is ready to

²⁴ PIAGET, JEAN, *The Child's Conception of the World* (Harcourt, Brace, (1929); also *La causalité physique chez l'enfant* (Alcan, Paris, 1927).

apply that conception generally, least of all to human beings. Many a civilized adult whose conception of causation in the "physical world" is thoroughly rational is still partly in the stage of magic in his wishful thinking about human relationships, as prevalent beliefs in telepathy and spiritualism testify.

Not only the rate at which children pass through the first primitive stages of thought but the degree to which their mature conceptions of the world and human life become rational are susceptible of control by adults, a point on which Piaget does not dwell. There are differences of opinion on the extent to which rational thought should be applied, but it would be generally agreed, probably, that the ability at times to see the world in an impersonal and objective way is essential to the attainment of what we might call "inner harmony." The child must learn sometime, if he is to lead an effectively integrated life, to look upon himself as merely one individual among an inconceivably large number of others of the past and future as well as of the present, living in a vast world which is not organized with reference to their wishes. And so, by whatever means they may, those who bring up children will wish to help them outgrow their first crude ways of thinking and achieve rational standards for conduct, to the end that sometime they may learn, as independent and mature personalities, thoughtfully to direct their own lives.

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WHILE the footnote references will serve as the best guide for supplementary reading for the advanced student, the following brief lists of selected references for each chapter are, in general, better adapted to the needs of the less advanced student or the general reader.

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